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Factors related to early interest in vasectomy as a family planning method in Kenya: instrument design, validation, and causal modeling

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Factors related to early interest in vasectomy as a family planning method in Kenya: Instrument design, validation, and causal modeling

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CHAPTER I. INTRODUCTION

Background of the Study

The world's population is increasing at a rate of approximately 93 million people every year. Most of the increase is experienced in developing countries, particularly in the sub-Saharan region of Africa (United Nations Population Fund, 1993). Each year, more resources such as food, shelter, energy, water, and social services are needed to support the additional people. The increase in the world's population places a heavy demand on world economies and it is a threat to the continued productivity of the environment. For example, experts now predict that half of developing countries may not be able to feed their inhabitants from their own lands (Population Information Program, 1992). For many of the countries in the sub-Saharan region, this prediction is already the bitter reality (Gleave, 1993). It is therefore not surprising that participants at the 1994 United Nations International Conference on Population and Development (ICPD) held in Cairo, Egypt, unanimously agreed that population and development are so closely interconnected that the latter can no longer be considered independent of the former (Bhagwut, 1994).

Use of family planning methods has long been recognized as a principal factor in the reduction of population growth but, as witnessed during the 1994 United Nations conference on population, choice of family planning methods is still a critical issue among nations (James, 1994; National Research Council, 1993). Ajzen and Fishbein (1980) have observed that each family planning method raises different issues among different subgroups of the population. This is particularly true in regions where communities differ significantly with regard to ethnicity, religion, local taboos, traditions, and values. For example, it

has been observed that religious, cultural, and political factors make family planning campaigns difficult in sub-Saharan Africa and therefore inhibit acceptance of modern family planning methods (Asamoah, 1988; National Research Council, 1993).

One available family planning method in sub-Saharan Africa is vasectomy or voluntary surgical contraception for men (Population Information Program, 1992). Vasectomy is widely regarded as a safe and effective form of male contraception. It is also economical in terms of time and monetary investment both to the client and the provider, and it does not require sustained motivation like most other methods (World Health Organization (WHO), 1988). Vasectomy is a minor surgical procedure that involves making a small incision in the skin and blocking the tubes that carry male sperm. The procedure takes about ten minutes and it provides 99% permanent effectiveness against pregnancy (Population Information Program, 1992). Vasectomy has fewer complications than female surgical contraception or tubal ligation. Complications requiring attention, such as infection or bleeding, occur in less than 3% of the cases although medical research indicates the possibility of some long-term physiological effects among a proportion of older adopters (Guess, 1990; Mettlin, Natarajan, & Huben, 1990).

Despite its many advantages, vasectomy is perhaps the least used method of family planning particularly in sub-Saharan Africa. Even when compared to the more complicated tubal ligation procedure, vasectomy lags behind in use. For example, it is estimated that over 140 million couples in the world rely on tubal ligation, whereas only 42 million couples rely on vasectomy, with fewer than 100,000 in sub-Saharan Africa (Population Information

Program, 1992). Lack of an effective policy on vasectomy and the providers' lack of attention towards the method may also have compounded the problem of low acceptance of vasectomy in sub-Saharan Africa. It is important to note that vasectomy is a relatively new form of male contraception especially in developing countries. Widespread introduction of vasectomy in Africa occurred only 20 years ago when male fertility became a priority of the Human Reproduction Program of the World Health Organization (Ringheim, 1993).

Vasectomy is poorly understood. Aruasha (1989) observes that men tend to fear having vasectomies probably because they are unable to differentiate between being virile and being fertile. There may also be a tendency for men to believe that vasectomy violates established social norms. Kanyi (1984) suggested that the negative attitude towards vasectomy in sub-Saharan Africa may be related to cultural values, religious factors, misconceptions, and misinformation.

Because men are biological partners in the reproductive process and because demographers in Africa have previously focused their attention on involving women in family planning, there is now an urgent need to shift part of the responsibility of family planning to men. The purpose of this study was to identify factors that inhibit early interest in vasectomy among young adult males in Kenya and propose potential solutions to the problem.

Study Site

Located on the east coast of Africa astride the Equator, Kenya has a total land area of approximately 580,000 square kilometers (Nelson, 1984). Twenty percent of the land supports 80% of the population (Probert, 1992). The

population, currently estimated at 26 million, is comprised of 44 indigenous ethnic groups. The annual growth rate of the population is estimated at 3.6% (Buren,1994). The major religious groups are Christianity, Islam, Hindu, and several traditional religions. Kenya's economy is entirely dependent on the agricultural and the tourism sectors. There are growing fears that, given the mounting pressure on land and the fragile, agrarian-based economy, Kenya may soon find it extremely difficult to support a young and rapidly rising population (McCown & Keating, 1992).

Kenya's economy is already feeling the strain. Existing statistics indicate that Kenya's Gross Domestic Product (GDP) growth rate dropped from five percent in the late 1980's to approximately two percent in the early 1990's (Buren, 1994). Currently, health services, education, and labor take the lion's share of the Government's recurrent expenditure (Central Bureau of Statistics, 1992). The unemployment rate is high and inflation continues to rise at an alarming rate. The worsening economic climate in the country recently forced the Kenya Government to institute the Structural Adjustment Program under the guidance of the World Bank and the International Monetary Fund. World Bank economists have emphasized that a significant reduction in the rate of growth of the population is a precondition for economic transformation and development in Kenya (World Bank, 1994).

Family Planning Issues in Kenya

Availability of services

Kenya is often credited with having been among the first countries in the sub-Saharan region to recognize the threat of uncontrolled population growth

on national development, and hence, on the quality of life of the people. Family planning was officially included in the national development plan during the 1974/79 development plan period, and since then, the Kenya Government has been expending considerable effort to curb population growth.

Family planning service delivery points are relatively accessible to most people in Kenya. For example, the National Council for Population and Development (NCPD) reported that 86% of women who had heard of family planning methods lived within 60 minutes of a provider (NCPD, 1989). Most family planning services are provided free to the general public. The Ministry of Health provides 70% of all family planning services through public hospitals, health centers, and dispensaries. The rest of the family planning services are provided by private doctors and non-governmental organizations. Vasectomy services are available on out-patient basis in many towns.

Despite availability of services, use of vasectomy as a family planning method in Kenya remains extremely low. On average, 20 vasectomies are performed annually compared to over 11,000 tubal ligations (Population Information Program, 1992). The tendency of existing family planning programs to target women more than men may contribute to the low acceptance of vasectomy in Kenya. But it could also be due to men's failure to participate in family planning, leaving the responsibility to women (Women's Bureau, 1992). Hence, the low acceptance of vasectomy in Kenya must also be seen as a gender issue. Regardless of the reasons, the low acceptance of vasectomy in Kenya has far reaching implications for the demographic structure of the population and hence, for the economic well-being of the people.

Family planning and youth in Kenya

In recent years, there has developed considerable interest in adolescent fertility in Kenya. This interest has been primarily due to the recognition that youth comprise the bulk of Kenya's population. Seventy percent of Kenya's population is aged 25 years or less, and one in four Kenyans is an adolescent aged 10 to 20 years (United Nations, 1990). This means that the bulk of the nation is yet to complete, if not commence, childbearing. Therefore, because of their numbers, adolescents' reproductive behavior will greatly influence the demographic structure of the country in the years to come. This will have a big impact on Kenya's national development.

Family planning education for the youth is a sensitive topic in Kenya mainly because many perceive that educating young people about family planning methods may predispose them to early sexuality (Ng'weno, 1993). Making contraceptives available to youth is even more controversial because it is often perceived as tantamount to sanctioning premarital sex. Existing research indicates that adolescents may have little access to family planning services. Further, the Government's current policy regarding family planning education in schools is unclear (Kigondu, 1986; Kiragu 1991). A proposal to introduce sex education in primary schools in 1994 was suspended after the idea triggered a huge public furor (Ng'weno, 1994).

Most of the research in adolescent fertility in Kenya has tended to focus on primary and high school students (Khasiani, 1985; Kiragu, 1991; Lema, 1987; Oniang'o & Rogo 1986). One group that seems to have been largely ignored by researchers is the undergraduate population in Kenyan universities. This study focused on the undergraduate population in Kenyan universities.

University students as change agents in family planning

Although the undergraduate population accounts for only a small proportion of youth in Kenya, one important reason for targeting this group for family planning research, information, education, and communication is that they are likely to become change agents in the future. Compared to other young people in the population, this is a select group of highly motivated individuals who, by virtue of their education and training, are most likely to hold responsible positions in the society when they graduate. They are likely to become managers, leaders, and policy-makers in both Government and industry. Their professional training, and the social status that goes with it, will enable them to exert great influence on the rest of the society with relative ease and frequency. As such, they should be considered change agents of tomorrow. In fact it has been observed that "change agents are often professionals with university degrees in technical fields" (Rogers, 1983; p. 28).

London (1988) defines a change agent as a person who has the ability to convert an issue into a felt need. A charismatic leader, manager, or policy-maker does precisely that. Effective change agents become the first adopters of innovations. Going beyond implementation, change agents internalize the innovation making it a norm in their lives (London, 1988). As future change agents, university students' beliefs about the population problem and specifically male students' awareness, knowledge, attitudes, and interest in vasectomy become more important in the wider context of formulation and implementation of family planning policies in Kenya.

A typical undergraduate student in Kenya is between 18 and 25 years of age. At this stage in their life cycle, college students will most likely start

thinking about possible careers, their roles in society, and the life-goals they wish to achieve after graduation. Among these are likely to be marriage and family considerations. In this study, the focus is on university students first, and foremost, as agents of social change and secondly, but critically, as recipients of vasectomies after they have had children.

Theoretical Framework

A good understanding of the decision-making process that leads to the adoption of vasectomy as a family planning method is critical to the success of vasectomy promotion programs in Kenya. Understanding the vasectomy decision-making process enhances the effectiveness of vasectomy counseling and increases the acceptance of the method (Mumford, 1983). The decision to adopt vasectomy is a process that takes time (Allen, 1985) and it involves a number of stages. Mumford (1983) noted that the decision to adopt vasectomy took between two and ten years and information about vasectomy was the most important factor during the entire decision-making process.

The classical diffusion of innovation model as conceptualized by Rogers (1983) provides a logical framework for analyzing this decision process. According to Rogers (1983), diffusion is a type of communication concerned with the spread of new ideas, technologies, or practices. It is the process by which an innovation is communicated among a social group through certain channels. The theory of diffusion and adoption of an innovation proposes that, from the baseline of its introduction, the number of acceptors slowly increases as information about the innovation is diffused through the community until a sufficiently large group, a critical mass of adopters, is reached. Adoption then

rises sharply as information about the new technology is diffused rapidly through channels such as word of mouth, media, peers, and change agents. Thereafter, diffusion declines as by now, the innovation has found most of its potential adopters (Rogers & Shoemaker, 1971).

Rogers (1983) argues that many innovations require a lengthy period, from the time when they are first introduced to the time when they become widely accepted by members of the society. During this period, each potential adopter of the new innovation goes through the innovation-decision process. Rogers (1983) conceptualizes five stages in the innovation-decision process. These stages are: knowledge, persuasion, decision, implementation, and confirmation. See Figure 1. During the innovation-decision process, a person first gains knowledge of the idea, technology, or practice. The individual then evaluates the innovation and forms unfavorable or favorable attitude towards it. Decision occurs when one is involved in activities that lead to a choice either to accept or reject the innovation. At the implementation stage, a person acts on the decision by putting the innovation into use. Confirmation involves seeking reinforcement and approval regarding the initial decision to use the innovation.

Downs and Mohr (1976) observed that the diffusion of innovation theory has emerged as a powerful conceptual tool for attacking many social problems. As such, the innovation theory has been applied to many disciplines. In family planning, for example, studies document the widespread adoption of modern family planning methods in the 1970's in Indonesia (Sujono, 1974) and Chile (Fuller, 1974). However, Brown (1981) cautioned that all members of a society do not adopt an innovation simultaneously and some never do. Further, a comparison of adopters and non-adopters of a given innovation would

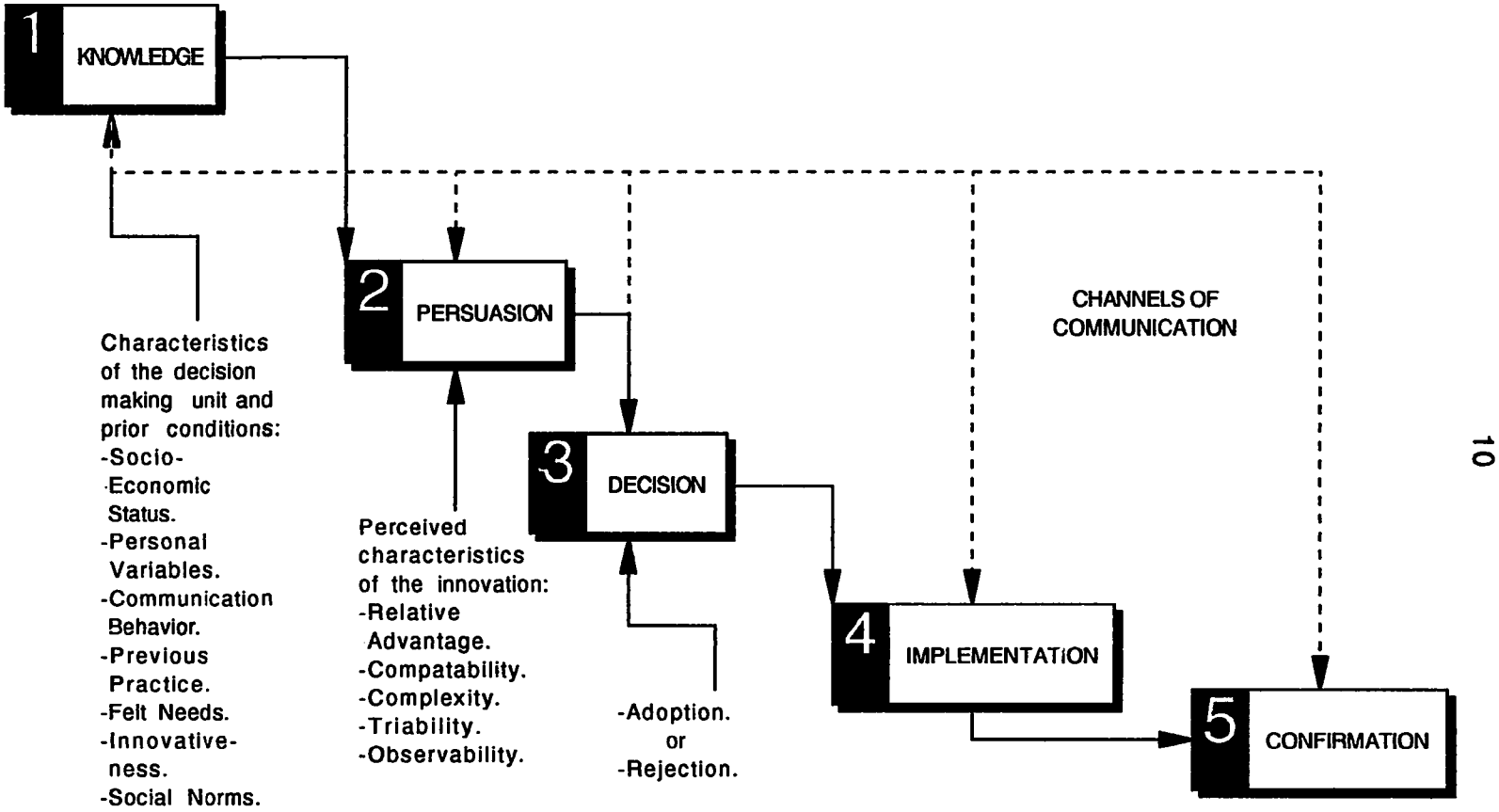

Figure 1. A model of stages in the innovation-decision process (Rogers, 1983).

generally reveal systematic differences in factors such as economic, social, locational, and demographic characteristics. These factors should therefore be considered as prior conditions when investigating the rate of adoption of an innovation such as a family planning method in a given socio-cultural setting.

Basing their arguments on Rogers' (1983) diffusion of innovation model, William and Cogswell (1991) suggested five stages in the adoption of vasectomy as a family planning method. These stages occur in a time-ordered sequence of awareness, comprehension, persuasion, intention, and action. Awareness of vasectomy occurs when individuals are exposed to information about the method through the media, peers, or providers. If people do not know of the existence of a particular family planning method, or have heard of it but do not have enough information about it, that method is not an option to them. Similarly, if people do not know where to obtain family planning services that are available in the community, they will never use the methods although they are potential adopters. Failure of vasectomy to find acceptance throughout much of Latin America has been blamed on lack of awareness and accessibility (Bailey, Patricia, Castro, Arujo, Castro, & Janowitz, 1991).

Comprehension is the knowledge one has regarding the method. It occurs when a person gains a reasonable understanding of how the method works. Knowledge of vasectomy is gained through education or the communication of correct information regarding family planning methods. Family planning education helps to remove barriers such as misconceptions, misinformation, fear of side effects, or negative attitudes towards modern methods. In general, a person who is knowledgeable about a family planning method will be able to describe how the method works, the possible side

effects, and will use the method correctly. Research indicates that men tend to be less knowledgeable about vasectomy compared to other family planning methods (Mugenda & Mugenda, 1991).

Persuasion is concerned with people's attitudes toward an innovation. One of the most widely used approaches in analyzing changes in human behavior is the sociopsychological study of attitudes (Lynn, 1984). Attitudes are "adaptation abstractions, or generalizations about functioning in the environment especially the social environment; that are expressed as predispositions to evaluate an object, concept, or symbol" (Lynn, 1984, p. 5).

McGuire (1989) presents several models that are often used to study the structure of individual attitudes. One such approach is the dimensional model. The dimensional model attempts to identify dimensions within individual attitudes. Dimensions can either distinguish topics of meaning or the bases of judgment. Therefore an analysis of an individual's attitude towards vasectomy should reveal the dimensions within which the method is judged as favorable or unfavorable. Such dimensions would include cultural values, religious beliefs, medical concerns, moral or ethical concerns, gender issues, and economic factors. Intention, the fourth stage in the adoption of vasectomy, is concerned with creating enough interest with the method. Potential clients will often express great interest in the method and may seek more information about the method from various sources. The last stage in the decision process is action and it culminates in the individual visiting the clinic for the actual procedure. Generally, vasectomy remains rare in sub-Saharan Africa where it is estimated that fewer than 100,000 couples rely on the method (compared to over 18 million couples in India alone) (Population Information Program, 1992).

Conceptual Model

The conceptual model developed for this study is shown in Figure 2. Although Williamson and Cogswell (1991) propose five stages in the adoption of family planning methods (awareness, comprehension, persuasion, intention, action), this study focused on the first four stages. The fifth stage (action) was omitted from the conceptual model because college students are more likely to be vasectomy adopters later in their lives when they have had the number of children they desire. In the model, awareness and comprehension were combined because they were assumed to be two levels of the knowledge construct. Persuasion and intention were conceptualized as attitude and interest, respectively.

The conceptual model used in this study is similar to another framework, often referred to as family planning knowledge, attitude, and practice (KAP), which has often been used effectively in the evaluation of family planning programs (Stycos, Sayed, Avery, & Fridman, 1988; Rogers, 1983). Researchers have previously indicated that prevalence of family planning methods is related to religious affiliation, age of client, number of children desired, and exposure to family planning information (NCPD, 1993; Rogers, 1983). These variables were therefore included in the hypothesized model.

In the model, it was expected that interest in vasectomy would be explained by attitude towards vasectomy, religious affiliation, age of respondent, number of children desired, and exposure to family planning information. It was further expected that attitude towards vasectomy would be explained by knowledge of vasectomy, religious affiliation, age of respondent, number of children desired, and exposure to family planning information.

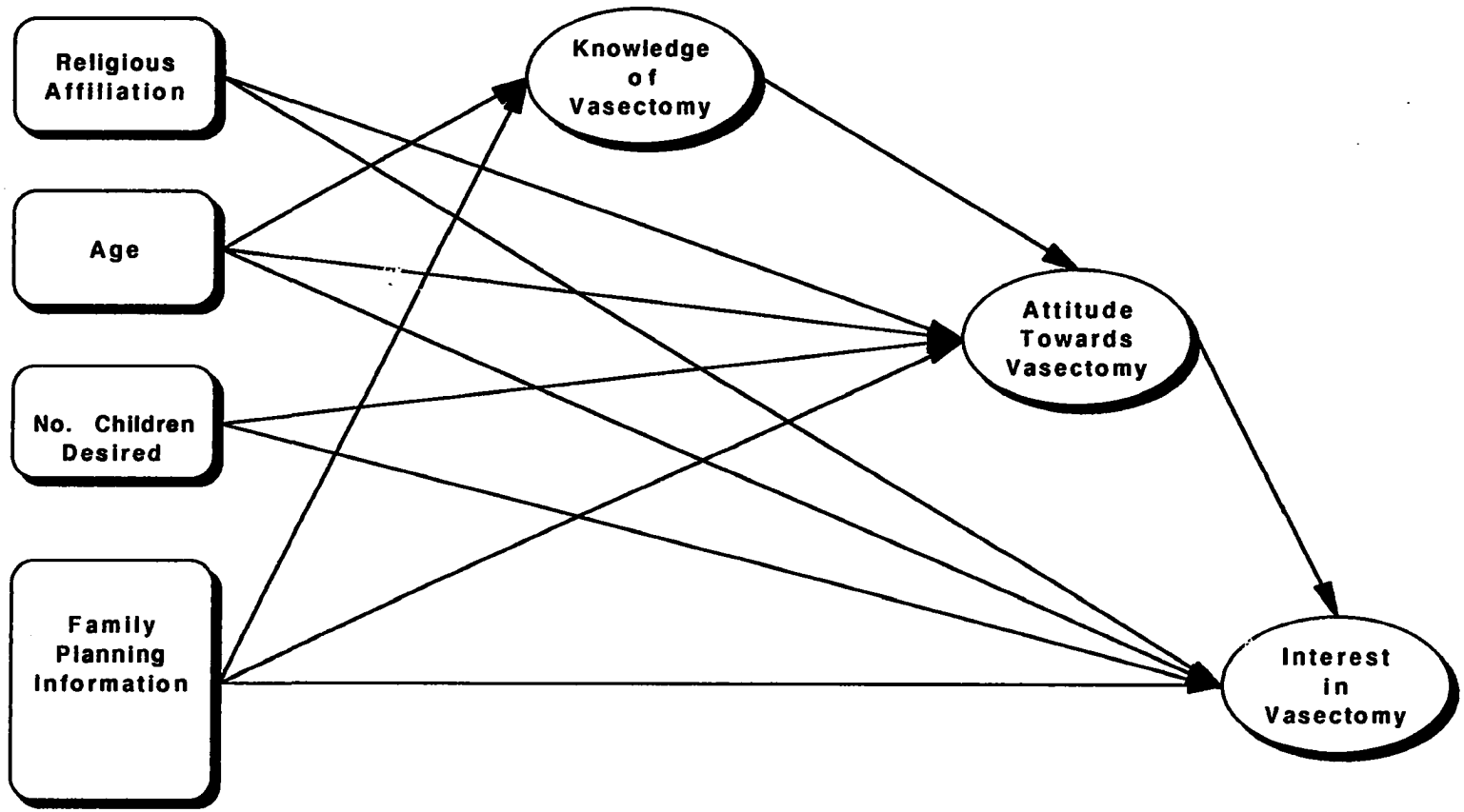

Figure 2. Hypothesized path model.

Finally, it was expected that knowledge of vasectomy would be explained by age and exposure to family planning information.

Based on the conceptual model, several hypotheses were formulated as discussed later in this chapter. The hypothesized relationships were then tested using structural equation modeling.

Need for the Study

Family planning research in Kenya has largely focused on knowledge, attitudes, and practices among adults (Khasiani, 1991; Mugenda & Mugenda, 1991; Ferguson, 1992). Among youth, studies have tended to focus on sexual behavior of primary and high school students (Kiragu, 1991; Lema, 1987; Oniang'o & Rogo, 1988). Research on knowledge, attitudes, and interest in vasectomy among young adults is lacking.

Lack of research on vasectomy among youth may be due to the feeling that vasectomy is a family planning method only suitable to males during the later years of their married lives when they have had the number of children they desire. But attitudes and interests form early and the decision to seek vasectomy takes time. For example, in a survey of 105 vasectomy clients, 34% had considered the method more than two years before. Over half of the clients with either no child or one child had first thought of vasectomy more than two years prior to the procedure (Allen, 1985). Although the average age of men undergoing vasectomy has been estimated at 36 years (Vernon, Ricardo, Ojeda, & Vega, 1991), the current trend is towards younger acceptors (Ringheim, 1993). Therefore if positive attitudes toward vasectomy are to be instilled early, then research and educational programs for youth have to focus

on all areas of family planning including vasectomy.

Compared to other modern family planning methods, vasectomy has lagged behind in prevalence. Without conclusive research, it may be difficult to pin-point the major factors that inhibit acceptance of vasectomy in Kenya. It is imperative that such factors are identified among the various sub-groups of the population before targeting such groups for vasectomy promotion programs. There is, therefore, a need for a vasectomy study among college males in Kenya.

Statement of the Problem

The components of the research problem of this study were:

1. To develop a reliable instrument for measuring the variables of the study.
2. To assess the construct validity of the questionnaire by using factor analysis to verify the unidimensionality or multidimensionality of the variables of the study.
3. To modify the conceptual model of the study based on the results from factor analysis in step 2.
4. To describe male students' awareness of family planning methods as well as find out their sources of family planning information.
5. To describe male students' knowledge of, attitude towards, and interest in vasectomy.
6. To examine the relationships among sources of family planning information, number of children desired, religious affiliation, age, knowledge of vasectomy, attitude towards vasectomy, and interest in

vasectomy among college males by testing a statistical model using structural equation modeling.

Research Hypotheses

The hypotheses to be tested in this study are:

1. Interest in vasectomy will be directly affected by one's attitude towards vasectomy, religious affiliation, age, number of children desired, and family planning information. It will not be affected by knowledge of vasectomy. See Figure 2. Specifically, interest in vasectomy will increase as attitude towards vasectomy becomes more positive, as age decreases, as number of children desired decreases, and as people become exposed to family planning information. In addition, interest in vasectomy will change as religious affiliation changes.

People who desire fewer children are likely to have positive attitudes toward, and interest in family planning methods such as vasectomy. Older people and those who belong to certain religious groups are likely to have less interest in vasectomy because of cultural and religious beliefs respectively.

2. Attitude towards vasectomy will be directly affected by one's knowledge of vasectomy, religious affiliation, age, number of children desired, and exposure to family planning information. Specifically, attitude towards vasectomy will become more positive as knowledge of vasectomy increases, as age decreases, as number of children desired decreases, and as people become exposed to family planning information. In addition, attitude towards vasectomy will change as religious affiliation changes.

The rationale for this hypothesis is that respondents who are well

informed about family planning are knowledgeable about vasectomy. Respondents who are knowledgeable about vasectomy will have fewer misconceptions about the method and are therefore likely to have positive attitudes toward the method. Older people and those who have strong religious beliefs are likely to have negative attitudes toward the method.

3. Knowledge of vasectomy will be directly affected by one's age and exposure to family planning information. It will not be directly affected by religious affiliation or the number of children desired. Specifically, knowledge of vasectomy will increase as age decreases and as people become exposed to family planning information.

The rationale for this hypothesis is that people who have access to more family planning information are likely to be knowledgeable about vasectomy. However, older people may tend to ignore family planning information because of their cultural beliefs. Compared to younger people, older people are therefore more likely to be less knowledgeable about vasectomy.

Dependent and Independent Variables

In a hypothesized causal model, the independent variables are referred to as exogenous variables and are not expected to be influenced by other variables in the model. The dependent variables are referred to as endogenous variables. Unlike exogenous variables, each endogenous variable is expected to be influenced by other variables in the model.

In the model tested in this study, the exogenous variables are respondent's religious affiliation, age, number of children desired, and sources of family planning information. The endogenous variables are respondent's

level of knowledge about vasectomy, attitude towards vasectomy, and interest in vasectomy.

Limitations of the Study

The analyses in this study were limited to undergraduate students in Kenya. Generalizations should therefore be limited to similar populations. Where settings differ with regard to the level of economic development, educational system, and culture, generalizations should be made with caution. In addition, relationships among the variables may not imply causality because of the nonexperimental nature of the study. Because the data used in this study were collected through self-administered questionnaires, findings are only accurate to the extent that students' responses were honest and accurate.

Significance of the Study

Given that family planning education for young people is a sensitive issue in Kenya (Ng'weno, 1993), it is likely that existing family planning programs are not meeting their needs. A study of young males' knowledge, attitudes, and interest in vasectomy would be the first step towards providing useful information about vasectomy to them.

This study will also sensitize male students to the subject of vasectomy. Sensitizing young adults to an innovation triggers interest early in their lives and perhaps makes them potential adopters of vasectomy as well as motivators of other clients during adulthood. Data from this study will also provide a base against which future changes in knowledge, attitude, and interest in vasectomy can be evaluated.

CHAPTER II. REVIEW OF LITERATURE

The main purpose of this study is to determine the effects of respondents' religious affiliation, age, exposure to family planning information, number of children desired, knowledge of vasectomy, and attitude towards vasectomy on their interest in vasectomy. In this chapter, theoretical issues are first discussed. Literature relevant to the variables of the study is then discussed.

The Process of Adoption

In the context of innovation, adoption is the outcome of a system of personal decision-making that leads either to the acceptance or rejection of a new technology, practice, product, or idea (Spence, 1994). The process of adoption starts when an individual becomes aware of the new technology, practice, or idea and concludes when the innovation is put into full use. A number of factors are at work during the decision-making period. Although literature on adoption of innovation abound, perhaps the most classic model of adoption of innovation was developed by Rogers (1983) and published in the United States of America. Rogers (1983) theorized that the decision to adopt an innovation comprised of five stages: the individuals pass from awareness and knowledge of an innovation to forming an attitude towards the innovation, to a decision to accept or reject the innovation, to implementation of the new technology or practices and finally, to a confirmation of this decision. These stages have no clear cut boundaries but instead they are interrelated. Therefore, although each stage emphasizes different aspects of adoption, one stage may have a negative or positive impact on subsequent stages.

The innovation theory has been applied to various disciplines. Rogers (1983) referred to over 3000 studies in which the innovation theory has been applied. The application of the innovation theory cuts across various disciplines. For example, Rogers (1983) cited nine disciplines that have traditionally applied the innovation theory. These included: anthropology, education, marketing, geography, general sociology, public health, medical sociology, rural sociology, and journalism and mass communication.

In public health and medical sociology, the innovations studied included medical and health practices such as drugs, vaccinations, and family planning (Rogers, 1983). In most of these studies, the unit of analysis was the individual adopter or hospital. Results from such studies emphasized characteristics of the adopter categories and the most effective communication channels for the adoption process. Rogers' (1983) model of adoption focuses on the demand side of the adoption process. It emphasized the reasons that make individuals adopt or fail to adopt an innovation. Others have focused on the supply side of the adoption process (Brown, 1981).

Several factors affect the process of adoption. Spence (1994) identified six factors: predispositional factors, personal factors, situational factors, behavioral factors, intervening factors, and outcome factors. Predispositional factors are the internal forces and hereditary tendencies within individuals which predispose them to react in particular ways. Predispositional factors include personal philosophy, beliefs, values, and goals. Personal factors are the demographic characteristics including age, sex, ethnicity, religious affiliation educational level, etc. These characteristics cannot be altered retrospectively.

Situational factors are external to the individual but exist in the environment in which the individual operates. Examples of situational factors include the cultural norms and values within the family in which the individual is brought up. Behavioral factors relate to the personal decision-making process. Individuals differ in their response to perceptions of various phenomena and therefore some individuals will naturally make decisions faster than others. Intervening factors either stimulate or impede personal decisions and actions. These factors include: geography, infrastructure, resource base, and policy. Although these factors are often beyond the control of the individual, there should be an attempt to determine the extent of their influence on the adoption-decision process. Outcome factors result from the interactions among the other five factors. Outcome factors may cause changes in future attitudes toward either the rate of adoption of an innovation or the final acceptance of an innovation. Figure 3 shows the relationships among the six factors that influence innovativeness.

The model tested in this study is nested within Rogers' (1983) theoretical argument that awareness and knowledge about an innovation and forming favorable attitudes towards the innovation will facilitate the adoption process. See Figure 1. Within the context of Rogers' (1983) argument, making young males aware of vasectomy early will lead to attitude formation, which in turn, will lead to increased interest and ultimately result in the adoption of the method in the future. Religious affiliation, age, sources of family planning information, and number of children desired are introduced in the research model as personal and situational variables. Knowledge of vasectomy and attitude towards vasectomy are assumed to precede interest in vasectomy. See Figure 2.

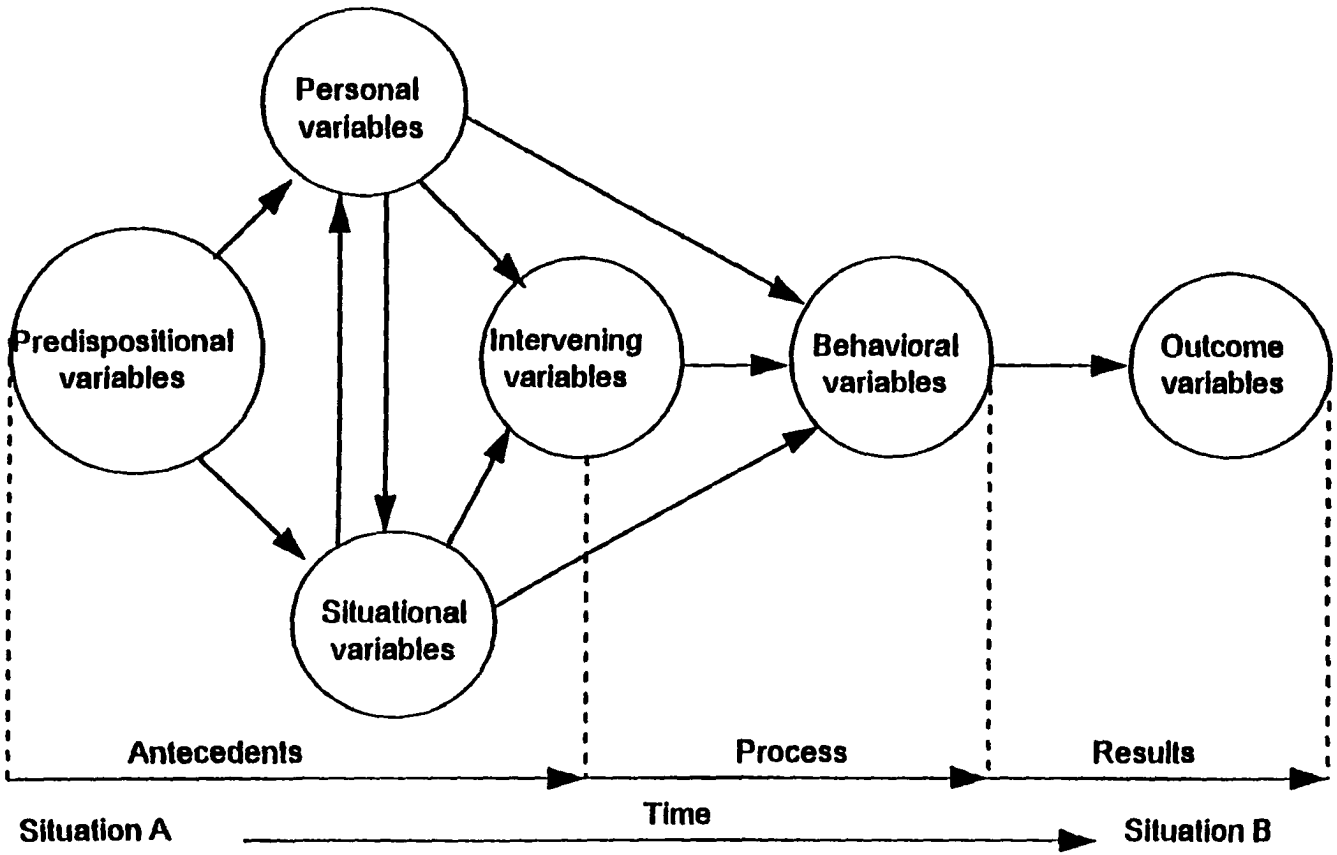

Figure 3. Factors influencing innovativeness (Spence, 1994, p. 47).

Awareness and Knowledge of Vasectomy

Kiragu (1991) emphasized the need to differentiate between awareness and knowledge when discussing family planning methods. In family planning research, a person is said to be aware of a method if he or she has heard of the method, can name the method, and knows where the method can be obtained from. Knowledge involves a deeper understanding of the method. A person who is knowledgeable about a method should be able to tell how the method is used, how it works, its advantages compared to other methods, and the possible side effects associated with the method (WHO, 1988).

Awareness of contraceptive methods is generally high among couples in Kenya. For example, in the National Survey (NCPD, 1993), over 90% of the couples interviewed were aware of the pill and over 80% were aware of injectables. Awareness of vasectomy however tends to be low in Kenya. Of all the couples surveyed in the 1993 National Survey, only 30% were aware of vasectomy (NCPD, 1993). This is consistent with an earlier study where only one third of the males interviewed had heard of vasectomy (Wilkinson, 1989). Findings from a recent survey of 618 husbands indicated that 69% of the respondents had heard about a permanent family planning method for men but only 40% could correctly name the method (Mugenda & Mugenda, 1992).

Although men seem to approve, and are generally knowledgeable about various family planning methods in Kenya, they are less knowledgeable about vasectomy (NCPD, 1993; Wilkinson, 1989). For example, 44% of the 618 men surveyed in Nairobi and Mombasa knew nothing about vasectomy (Mugenda & Mugenda, 1992). Wilkinson (1989) concluded that knowledge of vasectomy among the majority of the respondents in his sample was limited to just naming the

method. Elsewhere, other researchers have found that dissatisfaction with the method for those who have had the procedure is related to a lack of understanding about the method (Bertrand, Mathu, Dwyer, Thuo, & Wambwa, 1987).

Knowledge about a particular family planning method is gained through communication of correct information. Communication can be in the form of printed materials, electronic media, or counseling. The level of knowledge about a particular method is therefore a reflection of the quantity and quality of information available to people (WHO, 1988). Provision of family planning information to young people is a slippery issue in Kenya (Ng'weno, 1993). The current move is to block the introduction of family planning education at both primary and high school levels. In the absence of proper channels of communication, adolescents tend to turn to their peers for reproductive health information (Ayo, Marangu, Miller, & Paxman, 1991). In many African communities older people counseled the youth on matters of sex and marriage, but as Ayo *et al.* (1991) observed, this legacy is dying especially among the educated members of the community. Yet, young people need the information and services to avoid the dangerous consequences of premarital sex. Studies show that knowledge of family planning methods tends to rise with increased education especially among young adults (Ayo *et al.*, 1991). A framework for providing correct information to young people in Kenya is perhaps long overdue.

The current approach to the measurement of knowledge of family planning methods in many research and evaluation studies also needs to be addressed. The common practice has been to categorize those respondents who can name the most methods as knowledgeable (NCPD, 1993). The poor measurement of knowledge of family planning methods may explain the disparity between the level

of knowledge and actual use of family planning methods reported in many studies. Kiragu (1991) observed that there is a distinct difference between awareness and knowledge of family planning methods and that awareness alone is not enough to induce contraception. In this study, a more detailed approach to the measurement of knowledge in vasectomy is used. Several knowledge items will be used to cover various content areas, which include: benefits of the method, complications associated with the method, misconceptions and rumors, and medical facts about the method. The items used will also reflect different difficulty levels.

Attitude Towards Vasectomy

Perhaps the most classic definition of attitude was formulated by Allport in the mid-1930's. Allport (1935) defined attitude as a mental state of readiness to respond to situations or objects which is gradually achieved through experience. Later, a broader conceptualization of attitude was presented by Rosenberg and Hovland (1960). According to Rosenberg and Hovland (1960), attitude is a predisposition to respond to some external stimuli. The external stimuli could be objects, social issues, or experiences. Rosenberg and Hovland (1960) argued that the attitude concept has three dimensions: the cognitive domain, the affective domain, and the behavioral domain. This approach to the study of the attitude paradigm is often used in research and has come to be known as the tri-component view of attitude.

The cognitive domain of attitude refers to a person's evaluative judgment of an object, practice or idea. This evaluation is based on available information about the object, practice, or idea. The more accurate the information available to people, the more objective will be their evaluations of the object, practice, or idea.

Rosenberg and Hovland (1960) argued that the cognitive domain of attitude can be inferred from peoples' verbal statements of beliefs about the object. In the context of this research, the cognitive domain of attitude towards vasectomy refers to college males' perceptions about the medical, social, and economic advantages of the method.

The affective domain of attitude towards an object involves the sympathetic nervous system. It represents a person's likes or dislikes often based on a subjective evaluation of the object. The affective domain of attitude is therefore more of an emotional perception about the object. According to Rosenberg and Hovland (1960), the affective domain of attitude too could be inferred from peoples' verbal statements about the object. In this study, the affective domain of attitude towards vasectomy refers to peoples' perceptions regarding the social and ethical consequences of using vasectomy as a family planning method.

The behavioral component of attitude refers to a person's actions or intentions toward the attitude object. Rosenberg and Hovland (1960) further argued that the cognitive and affective domains of attitude are organized in some congruence with one another. Under certain conditions, a change in the affective domain results in a given change in the cognitive domain. To achieve equilibrium, the behavioral dimension must also change. In this study the focus is on the affective and cognitive domains of attitude towards vasectomy. Interest in vasectomy is assumed to subsume the behavioral component of attitude towards vasectomy.

Generally, men's attitudes toward vasectomy in Kenya are negative (Kanyi, 1984; Wilkinson, 1989). Of the 618 husbands surveyed in one study, less than 29% were categorized as having positive attitudes toward vasectomy (Mugenda &

Mugenda, 1992). Negative attitudes toward vasectomy in Kenya have often been associated with a lack of understanding about the method (Aruasha, 1989). Others have suggested that negative attitudes toward vasectomy are due to rigid cultural beliefs and non-accommodating religious views especially among men (Kanyi, 1984).

Current research studies among adolescents in Kenya show that young people tend to have more positive attitudes toward family planning methods compared to older, married men (Barker & Rich, 1992; Kiragu, 1991; Ayo *et al.*, 1991). It is therefore likely that the younger generation of males in Kenya may have a positive attitude towards vasectomy. This argument should be true if one assumes that, because they are less influenced by tradition, younger males tend to evaluate the method from an intellectual rather than an emotional perspective. However, it must also be assumed that young people have access to accurate information about the method. Although the group surveyed in this study has access to family planning information and services at the university health clinics, other young people may not have access to even the most basic information about reproductive health. In fact the tendency is to block the introduction of programs aimed at giving young people such information (Ng'weno, 1993)

Interest in Vasectomy

Fertility regulation in many countries has never been shared equally between men and women (Ringheim, 1993). In many African countries for example, emphasis has been on the role of women in family planning probably because they often bear the physical and emotional strains of raising children. This preoccupation with the role of women in family planning has tended to

minimize the reproductive motivation of African men, hence, ignoring the social significance of the people who traditionally have been dominant not only within the family, but also at both the community and national levels (Isiugo-Abanihe, 1994).

Non-participation of African men in family planning has also been compounded by sociological and institutional factors. Traditionally, men in many parts of Africa made decisions regarding marital and family life. Because children enhanced a father's social and economic status, men preferred large families. Although cultural values are rapidly being replaced by new attitudes and social norms, male dominance is still widespread in Africa and decisions on the number of children in the family is still very much the father's verdict. In a recent study for example, Isiugo-Abanihe (1994) found a strong desire or preference for large families among Nigerian men regardless of their social class or educational level. Bankole and Olalaye's (1993) findings in present-day Kenya parallel Isiogo-Abanihe's (1994) observations.

Methods of controlling male fertility have been known for many years (Ringheim, 1993) but research on such methods has not been widely conducted. In sub-Saharan Africa, the condom has perhaps been the most common form of male contraception and continues to be especially under the shadow cast by the dreaded disease - AIDS. Vasectomy on the other hand, is a relatively new method of controlling male fertility in Africa (Population Information Program, 1990). Widespread introduction of vasectomy occurred in the early 1970s under the sponsorship of the World Health Organization (WHO, 1988). Vasectomy or voluntary surgical contraception is the legation or blocking of the vas deferens under local anesthesia. Contrary to widely held misconceptions in Africa, it has no

effect on masculinity or sexual desire among males who have had the procedure (WHO, 1988).

Literature on vasectomy reveals vast differences in its use across cultures (Population Information Program, 1992). For example, vasectomy is a prevalent method of family planning in United States of America, Australia and New Zealand but little used in Third World countries. Data on the prevalence of vasectomy in Kenya is not reliable but available studies indicate poor interest in the method. Wilkinson (1989) found that only about 6% of the respondents in his study expressed interest in the method. In a more recent study of married men, Mugenda and Mugenda (1992) reported that only 23% of the respondents in their sample showed any interest in the method. In the 1993 National Survey, non-users of family planning methods were asked to state the method they would prefer to use in the future. Results showed that only 0.5% of the males interviewed indicated an interest in using vasectomy as a family planning method in the future (NCPD, 1993). It should be noted that interest in vasectomy, as operationalized in these studies, was not necessarily a commitment to use the method. The actual number of vasectomies performed in Kenya still remains extremely low despite an indication that interest in vasectomy is rising (NCPD, 1993). Perhaps there is a need for researchers to differentiate between casual interest in vasectomy and a deep commitment to have the procedure. This differentiation may perhaps facilitate a more accurate prediction of the conditions under which a client is likely to use vasectomy as a family planning method.

Biomedical and social science researchers are interested in establishing the factors that determine the prevalence of family planning methods. According to Ringheim (1994), method use is dependent on both method factors and human

factors. Method factors relate to the acceptability of the method. Acceptability is a quality that makes a family planning method attractive and satisfactory. It is a subjective evaluation and therefore it differs among people according to source, context, and timing of the evaluation (Marshall, 1977). People evaluate a method on the basis of its effectiveness, ease of use, and convenience of duration. Policy makers and service providers also determine acceptability of a method since they control access to a method through legislation and policy decisions, information and communication, supply of the method, and the physical location of services (Marshall, 1977). Human factors that determine method use include a person's desire to limit fertility, user's lifestyle, and the stage of his or her reproductive life.

Using Marshall's (1977) framework, vasectomy should be highly acceptable to people because of its medical and economic advantages. Available data, though scarce, does not indicate such a trend in Kenya. The influence of policy makers and service providers is also worth noting. Available information (Mugenda & Mugenda, 1991) show that service providers tend to ignore vasectomy when they are counseling new and returning clients and this could be a deliberate attempt to discourage the use of the method. With regard to policy makers and community leaders, their views about the method are not known since no such surveys exist in Kenya.

The permanent nature of vasectomy may discourage its use in Africa especially given the rigid cultural values. High infant mortality among children has also been used to explain the low prevalence of vasectomy in sub-Saharan Africa. It has often been argued that couples prefer to remain productive in case they lose their children through sickness. However, infant mortality rates have dropped substantially in many parts of Africa because of improvements in education,

medical care, and living standards. Hence, the low prevalence of vasectomy in Africa should no longer be associated with high infant mortality rates.

Provision of information and public campaigns have recently been used in an attempt to raise the prevalence of vasectomy in Kenya. Success of such campaigns still remains to be seen. Available research indicates that changing peoples' attitudes towards a method is a much more difficult task than changing their knowledge levels. For example, Bertrand *et al.* (1987) reported that communication had little impact on peoples' attitudes toward vasectomy. In another study, Mugenda and Mugenda (1992) found a significant relationship between attitude and a desire to have more information about vasectomy, but positive attitudes toward vasectomy were not related to interest in having the procedure.

Socio-Demographic Characteristics

Religious affiliation

Although family planning has generally become increasingly accepted in the World, and although the trend is now towards smaller families (Population Information Program, 1994), the fact still remains that many individuals do not have a simple choice in controlling their own fertility. A direct approach to the issue of family planning is often made more complicated by religious and moral beliefs (Kasirsky, 1972). Every individual possesses a conscience that affects his or her decision-making process to a certain degree. Conscience is molded by those moral values people acquire through religious teachings. However, religious convictions differ even within faiths. It is therefore not surprising that across and

within faiths, individuals often turn to their religion when making decisions regarding the use of family planning methods.

Certain religious faiths have openly approved the use of family planning methods (Kasirsky, 1972). Members of those religions that approve family planning will probably have no conflict of conscience when deciding on a particular method, whereas those whose religions dictate that they eschew family planning methods may find making such decisions emotionally painful.

Perhaps the Roman Catholic Church has been the most vocal in condemning the use of family planning methods (Kasirsky, 1972). With regard to surgical contraception, the Catholic Church is officially opposed to vasectomy as it is to all forms of sterilization. On July 25, 1968, Pope Paul VI made public an encyclical letter in which he emphasized the need to avoid unnatural methods of preventing births. On vasectomy, the Church's policy appears to approve vasectomies that may be done for pathological reasons only (Kasirsky, 1972).

The Islamic faith, too, is opposed to methods of family planning (Obermeyer, 1994). Islamic traditions are often construed as incompatible with feminist values hence the belief that reproductive choice, especially among Muslim women, is prohibited. Participation of Muslim men in family planning is even more rare given the uneven distribution of power among the sexes (Obermeyer, 1994). However, there is a possibility that the Islamic faith, like other religious doctrines, may have been used to legitimize conflicting positions on gender and reproductive choice. As Obermeyer (1994) observes, perhaps the conditions that affect people's options in family planning are the outcome of political strategies rather than the results of implementing a religious code. Political decisions do undoubtedly influence family planning but the extent of such influence has not been documented.

Most of the religious groups that fall under Protestants are silent on the use of family planning methods, whereas some have actually approved of their use (Kasirsky, 1972). These religious groups seem content to leave the decision on whether to use family planning methods to their members. In broad terms, religious groups seem to be divided between those who openly oppose the use of family planning methods and those who approve or are silent on the issue. The Roman Catholics and the Muslims fall in the former, whereas Protestants fall in the latter group.

It should be noted that even among religions that oppose the use of family planning methods, the decision not to use a method may often depend on the religious conviction of the individual. Research in Kenya indicates that the contraceptive-restraining effect of religion might be suppressed by the urgency to avoid pregnancy especially among the student population (Kiragu, 1991). It may not be surprising therefore to find that religiosity has only a weak effect on intentions to use family planning. However religion would be expected to have a significant effect on attitudes toward family planning. The present study aims at establishing the effect of being in a particular religious group on both attitudes and interest in vasectomy. It is not concerned with the effects of an individual's religious conviction.

Sources of family planning information

Over the last 20 years, the Kenya Government and several non-governmental organizations have actively been involved in the promotion of family planning in Kenya. Mass media has been extensively used to communicate family planning information to the public. Radio, newspapers, posters, and booklets have

perhaps been the most accessible sources of information to couples practicing family planning (Mugenda & Mugenda, 1991). Other organizations involved in family planning programs also provide print materials as well as counseling services to couples either free of charge or at minimal costs. Most of the participating organizations operate in both urban and rural areas.

The NCPD (1993) reported that nearly 70% of the males interviewed had listened to family planning messages on the radio. In another study (Mugenda & Mugenda, 1992), 42% of those who knew about vasectomy reported hearing about it on the radio, whereas 53% had read about it in newspapers or magazines. Relatively few men obtained their information from the health care system implying that men tend to have less contact with, if not avoid, family planning clinics as compared to women.

The total impact of family planning campaigns on the prevalence of vasectomy in Kenya is difficult to estimate. Despite numerous programs, availability of services, and extensive distribution of educational materials, vasectomy still remains a rare form of male contraception in Kenya (NCPD, 1993) and Africa in general. This raises a number of issues regarding family planning programs in Kenya. First, there may be questions regarding the quality and emphasis of family planning information available to people. One may be forced to speculate that available information raises awareness of certain methods without necessarily raising the level of knowledge or interest in those methods. Secondly, some sources of information may be more effective than others in presenting family planning information to the public. This would probably also mean that some organizations have more effective methods of communicating family planning messages. Perhaps more coordination of efforts could ensure less reproduction of

efforts and more effective programs that yield better results. Lastly, there may be questions regarding the audience for whom the information is meant. For example, current opposition to the provision of family planning information to youth may lead to early formation of negative attitudes and misconceptions among young people which, at adulthood, will be even more difficult to remove. Others have indicated that young people are now more likely than ever to share inaccurate reproductive health information among themselves (Ayo *et al.*, 1991; Kiragu, 1991).

Number of children desired

In many family planning studies in Kenya, the desired number of children has often been used as an indicator of fertility preferences. In the 1993 National Survey the ideal number of children for men was reported as 3.8 (NCPD, 1993). The ideal or desired number of children as reported by many studies may not be a good predictor of the future size of a Kenyan family because of two reasons. First, the index masks the differences in desired number of children between married and single respondents. As it was observed in the National Survey, the ideal number of children increases with the number of living children a respondent has; men with more children are likely to state four or more children as the ideal number, whereas men with fewer or no children are likely to state two or three children as the ideal (NCPD, 1993). Using this argument as a basis, two populations of respondents may be defined as: (1) Those who already have more children than they probably would have desired, (2) Those with two or fewer children and who are likely to have the number of children they actually desire. For the 1993 National Survey, the ideal number of children for these two groups was 3.3 for those with two or less children, and 4.6 for those with six or more children.

Perhaps the figure reported by respondents with two or fewer children is a better predictor of the future family size in Kenya. This suggestion is based on the assumption that men with two or fewer children are likely to effect their preferences. Men with more children may be trying to rationalize their larger families by reporting a higher number of children as the ideal. If there is any validity to this line of argument, the ideal number of children reported by young adults such as university students may be a better predictor of the future size of a family in Kenya.

The mean ideal number of children as reported by many studies also masks the effect of age on family size. It has been argued that men with larger families may report larger ideal family sizes because, on average, they are older and hence tend to hold on to attitudes they have acquired over a long period of time (NCPD, 1993). Younger men, on the other hand, are less conservative and are open to new ideas. Men's influence in the family and their motivation for offspring has been documented in Africa. Isiugo-Abanihe (1994) argued that African men place a high premium on children because of the tangible and emotional benefits derived from them. Children bring a high sense of satisfaction, they provide help around the home and the farm, and they constitute an important source of parental old-age support. In addition, children - especially sons, are considered agents of continuity for the family tree (Isiogo-Abanihe, 1994). Older, more conservative men would therefore be expected to desire more children compared to younger men. The relationship might however not be that simple when sex-role identification is considered.

According to Block (1984), sex-role identification is related to one's view of self in relation to expectant roles for members of the same sex. Bem (1981) proposed four categories of sex-role identification: feminine, masculine,

androgynous, and undifferentiated. Feminine-identified and masculine-identified individuals possess the psychological traits and attitudes which society stereotypically attributes to males and females, respectively. Androgynous individuals are said to possess both feminine and masculine characteristics. Undifferentiated individuals do not identify with either sex. The process of sex-role identification starts early in life and continues to be reinforced by societal norms until it is fully developed. Sex role-identification differs among individuals (Block, 1984); it often depends on the degree to which an individual internalizes society's standards and expectations.

Men who have internalized the expectations of the traditional Kenyan society would be expected to exhibit a high sense of masculine identity. Such individuals may express their sense of masculine identity in the desire for more children. They may consider it their obligation to continue the family name by having many children. Because sex-role identification starts early in one's life, a high sense of masculine identity may have the same effect on desire for more children among younger men as it does among older men. It is therefore important to control for this variable in family planning studies.

CHAPTER III. METHODOLOGY

This chapter discusses the methodology used in this study to collect and analyze the data. It contains information about the research design, selection of the sample, characteristics of the respondents, development and contents of the instrument used to collect data, data collection procedures, and the statistical procedures used to analyze the data.

Research Design

Quantitative research was used to address the research problem of this study. Quantitative research is based on the scientific paradigm that is distinguished by five basic philosophical assumptions (Borg & Gall, 1989). The scientific paradigm assumes a single, tangible reality fragmentable into parts which can be observed, measured, described, predicted, and controlled. Inquiry can converge into this reality until, finally, it is explained (Guba & Lincoln, 1983). During the process of inquiry, it is assumed that the inquirer maintains a discrete distance between himself/herself and the object of inquiry. Scientific research is therefore said to be objective because there is no interaction between the researcher and the phenomenon under study.

The goal of inquiry under the scientific paradigm is to accumulate a nomothetic body of knowledge. This knowledge is encapsulated in generalizations. Generalizations are context-free statements about similarities among units. Generalizations are assumed to constitute universal truth. Within the framework of the scientific paradigm, one assumes that every action can be explained as the result of a real cause that precedes the effect. The search for

cause-effect relationships is perhaps the mainspring that drives conventional research. Finally, inquiry under the scientific paradigm is assumed to be value-free. Therefore the outcomes of scientific inquiry are guaranteed by the methodology employed by researchers to be purely empirical.

Survey research was used in this study. Survey research is a method of systematically gathering factual data from a cross-section of the population. Data collection tools including questionnaires, observation checklists, interview guides, and self reports are used to obtain standardized information or data from all the subjects in the sample. Data are then analyzed and inferences made using statistical procedures.

Population and Sample

This study was conducted among undergraduate male students in Kenya. The undergraduate population in Kenya was estimated at 40,000 students distributed in five public and several private universities across the nation. Because of limitations in time and resources, only two public universities (University of Nairobi and Kenyatta University) and one private university (Daystar University) were included in the study. However, it would be reasonable to assume that population validity exists between the universities included in the study and the target population. Based on suggestions by Fisher, Laing, and Stoeckel (1983), sample size was determined using the following formula:

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = the desired sample size (if the target population is greater than 10,000).

z = the standard normal deviate at the required confidence level.

p = the proportion in the target population estimated to have the characteristics being measured.

q = 1-p.

d = the level of statistical significance set.

The standard normal deviate used at the 95 percent confidence level was 2. Because there were no estimates available for the proportion in the target population assumed to have the characteristics of interest, 50% was used as recommended by Fisher *et al.* (1983). The level of statistical significance was set at .05. The formula yielded a sample size of 400 subjects and a further 10% was added to allow for any drop outs. Therefore, 450 students were initially selected to participate in the study. The students were selected from sampling frames obtained from each of the three universities included in the study. The method of sampling used was simple random sampling. Each student on the list was assigned a number. Using the table of random numbers, 200 students were selected from the University of Nairobi, 200 from Kenyatta University, and 50 from Daystar University. Both Kenyatta University and University of Nairobi have about the same student population, whereas Daystar University has a relatively smaller student population.

A total of 430 male students finally completed the questionnaire. The response rate was therefore 96%. The high response rate attained in this study was probably due to the data collection procedure of completing questionnaires in group settings. In addition, students in Kenyan universities are not often asked to complete surveys and their inclusion in this project may have motivated them to complete the questionnaires.

Of the 430 respondents, 200 were from Kenyatta University, 188 were from Nairobi University, and 42 were from Daystar University. Approximately 40 departments were represented. Results show that respondents were more or less evenly distributed among the first, second, third, and fourth years of study with the percent of second year students being slightly higher than the others. See Table 1.

Table 1. Distribution of respondents by year of study (n = 430).

Year of study	n	%
First	89	20.70
Second	143	33.70
Third	103	24.00
Fourth	92	21.30
Sixth	3	.70
Total	430	100.00

Respondent's age ranged from 19 to 33 years. The mean age of respondents was 22.69 years and the median was 22 years. The standard deviation was 2.06. Approximately 92% of the respondents were between 19 and 25 years old. The majority of respondents were Protestants, Catholics, or Muslims. See Table 2.

Respondents' marital status and number of children were also investigated. Of the 430 students surveyed, 19 (4.40%) were married and 2 (.50%) were divorced. Table 3 shows the number of children of those who were either married or divorced. Their average number of children was 1.67.

Table 2. Religious affiliation of the respondents (n = 430).

Religious affiliation	n	%
Protestant	255	59.30
Catholic	136	31.60
Jehovah's Witness	19	4.40
Islam	9	2.10
African Tradition	6	1.40
Seventh Day Adventist	4	1.00
Hindu	1	0.20
Total	430	100.00

Table 3. Number of children of married or divorced respondents (n = 21).

Number of children	n	%
0	2	9.50
1	10	47.60
2	5	23.80
3	2	9.50
4	1	4.80
5	1	4.80
Total	21	100.00

Instrument Development

The instrument used in this study was developed by the researcher in the Fall of 1994. The instrument is shown in Appendix A. Structured items were designed to obtain information about respondents' demographic characteristics, sources of family planning information, awareness of family planning methods, knowledge of vasectomy, attitudes toward vasectomy, and interest in vasectomy. The instrument was reviewed at all stages of development by measurement, evaluation, and statistics experts at Iowa State University and by several family planning professionals in Kenya. The reviewers critically examined the concepts covered by items in the instrument, item construction and format, and the overall layout of the instrument. Reviewers' suggestions were incorporated in the questionnaire at each stage of development.

A pilot test on a sample of 30 university male students in Kenya was then conducted. Students who participated in the pilot study were eliminated from the sampling frames. During pilot testing, students were asked to evaluate the comprehension, clarity, and suitability of the items. They were also asked to comment on the time taken to complete the questionnaire. Minor changes to items were made based on the feedback from those who participated in the pilot test. The questionnaire took approximately 25 minutes to complete.

The final questionnaire included three scales: a knowledge scale, an attitude scale, and an interest scale. Some items in the questionnaire were designed to obtain information about subjects' background characteristics and their sources of family planning information. See Appendix A. A discussion of each section in the questionnaire is given below.

Background characteristics Respondents were requested to supply the following information: college major, age, number of children, number of children desired, name of the family planning program they had listened to, and the type of family planning information they had read. Respondents were also asked to check the following from a list: year of study, marital status, religious affiliation (Protestants, Catholic, Muslim, etc.), family planning methods they had heard about, and sources of family planning information (read newspaper, booklet, etc., heard radio program, talked to a medical service provider, etc.).

Knowledge about vasectomy Nineteen items were combined to measure knowledge of vasectomy. The items used related to the following areas: naming the method correctly, advantages of the method, how the method works, possible complications or side effects, and common misconceptions about vasectomy.

The multiple choice response format was used on most items with a few true/false items. Examples of knowledge items are: (1) How long do you think it takes to perform vasectomy? (2) What do you think is the rate of effectiveness of vasectomy? (3) How long do you think one needs to be hospitalized after vasectomy? Correct items were keyed one and the respondent's total score was computed as a percentage of items scored correctly.

Attitude towards vasectomy A scale with twenty six items was used to measure respondents' attitudes toward vasectomy and family planning in general. Items assessed the influence on attitudes toward vasectomy of factors such as culture, religion, morality/ethics, economics, health, and education.

Likert scaling was used to score the items. Items were presented as declarative statements followed by five response options (strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1)). Respondents were asked to indicate their level of agreement or disagreement with the statements. Positively worded and negatively worded items were used to discourage acquiescence or response set. Examples of attitude items are: (1) Having a vasectomy is morally wrong, (2) A man who has had a vasectomy is admirable, (3) Vasectomy is for poor people, (4) Having a vasectomy is a cultural taboo. A respondent's total score was computed as the mean of all responses checked. These scores should not be interpreted as absolute amounts of the attribute the respondent possesses. They are estimates of the distances between individuals with regard to the attribute being measured (DeVillis, 1991).

Interest in vasectomy Ten items were combined in a scale to measure interest in vasectomy. Respondents were asked to indicate the likelihood that they would approve of the method, seek more information about the method, consider the method in the future, recommend the method to others, and discuss the method with other people. Items were scored on a five-point scale (very likely (5), likely (4), neutral (3), unlikely (2), not at all (1)). Examples of interest items are: (1) How likely are you to seek more information about vasectomy from a clinic provider? (2) How likely are you to consider vasectomy as a family planning option in the future? (3) How likely are you to discuss vasectomy with your partner?

Each respondent's score was computed as the mean of the responses checked. As in the attitude scale, these scores should be interpreted as an

estimate of the distances between individuals with regard to the attribute being measured (DeVillis, 1991).

Data Collection Procedures

The Human Subjects Review Committee at Iowa State University reviewed and approved this study. Prior to data collection, the researcher requested permission to conduct research in Kenya from the Office of the President, Nairobi, Kenya. Permission was granted under the Standing Research Clearance Agreement between the Kenya Government and all public and private universities. See Appendix B.

Each student who was selected to participate in this study was informed by letter and his consent to participate in the study was later obtained (see Appendix C). Students selected from each university were given several dates during which they could complete the questionnaire in a group setting. Each student indicated a date convenient to him. At each session, the selected students assembled at a central point and questionnaires were then distributed. Before the students completed the questionnaires, the researcher first explained the purpose of the study and then read the instructions to the students. The researcher further Informed the students that their responses would be confidential and that they had the right to withdraw their consent and to discontinue participation in the study at any time without prejudice to them. Completing the questionnaires in a group setting was preferred because it guaranteed a standard procedure of collecting information. Further, data are likely to be more reliable because there is no likelihood of respondents seeking answers to knowledge questions from other sources.

Data Analysis

Data were entered using version 4.1 of the Statistical Package for Social Sciences (SPSS PC+). Data were then loaded onto the main frame at Iowa State University. Analyses were done using the Statistical Package for Social Sciences (SPSS) version 4.0 and LISREL 7.0 (SPSS Inc., 1990; Joreskog & Sorbom, 1989). Initial frequencies were obtained and the data checked for range and type. Inconsistencies were resolved by referring to the original questionnaires for correction. Descriptive statistics including percentages, means, modes, and standard deviations were then computed for all the items.

Factor analysis was conducted on the three scales: knowledge, attitude, and interest. Factor analysis is a powerful statistical technique that reduces a large number of correlated variables to a manageable number of factors or latent variables. Tinsley and Tinsley (1987) observed that factor analysis uses the smallest number of explanatory concepts to account for the maximum amount of variance in a correlation matrix. Factor analysis also provides evidence of construct-related validity of the data. Varimax rotation was used. In this study, a factor loading of 0.40 was used as the cutoff point for the elimination of items in each major factor. As a result, several items were eliminated from the attitude scale.

For both attitude towards vasectomy and interest in vasectomy, scales were developed using the items that were retained in each major factor. For each scale, a mean for each respondent was computed by summing scores on items and dividing by the number of items. A reliability analysis was then conducted for the items in each scale.

Factor analysis was conducted on the knowledge test to verify whether

items empirically clustered around the content and cognitive categories judged relevant to the knowledge construct. All factors in the knowledge construct were combined into one scale to reflect the different content areas as well as the relevant cognitive levels of the construct. A reliability analysis was then conducted. Items were deleted from the scale only if their elimination increased the reliability of the scale. Reliability analysis of the knowledge construct resulted in the elimination of a few items from the knowledge scale. The elimination of these items did not appreciably change the content of the knowledge scale.

Pearson product-moment correlation coefficients were computed on the revised scales and on all other variables in the model. The correlation matrix was inspected for the presence of multicollinearity. Pedhazur (1982) observed that correlations greater than .70 between pairs of the exogenous variables affect the explanatory power of these variables and may mask the true magnitude of the parameter estimates. In this study, none of the correlations between pairs of the exogenous variables was greater than .20. Therefore multicollinearity was not considered a potential problem. The research model was modified based on the results obtained in the factor analysis. A detailed discussion of these analyses is presented in Chapter IV.

The statistical procedure used to test the modified research model was path analysis. Path analysis, first used by Sewall Wright in 1918 (Klem, 1995), is a powerful statistical procedure often used to test theoretical arguments. The researcher's theory about the causal relationships among a set of variables is the starting point for path analysis. Four steps characterize the application of path analysis: (1) Specification, (2) Identification, (3) Estimation, (4) Evaluation

(Bollen, 1989). Model specification refers to the systematic selection and ordering of variables in the model according to theoretical arguments. Identification is the process of determining whether a unique solution for the parameter estimates exists. Estimation is the computation of the parameter estimates, whereas evaluation is the process that establishes the model-data consistency (Bollen, 1989; Pedhazur, 1982).

The model tested in this study is what Joreskog and Sorbom (1989) categorized as causal models with directly observed variables. Although in this type of causal model the variables are assumed to be measured without error, the reliability estimates of the endogenous variables were built into the model in this study. Including the reliability estimates in the analysis minimizes the standard errors associated with the parameter estimates and hence, it increases the accuracy of each parameter estimate. LISREL was used to estimate the model parameters and to assess the fit of the model to the data. The structural equations were solved using the maximum likelihood approach. In using the maximum likelihood approach, it is assumed that a unique solution does not exist and the method therefore estimates the model parameters most likely to have generated the data. A standardized beta or gamma coefficient was computed for each hypothesized path. A t-statistic was used to evaluate the significance of each parameter estimate. In this study, a statistical significance of $p \leq .05$ was used to determine the rejection of the null hypotheses.

LISREL was also used to estimate the indirect and total effects among the variables. Alwin and Houser (1975) have observed that total effect, that is, the sum of direct and indirect effects, is the change induced in a consequent variable by a given shift in an antecedent variable, irrespective of the

mechanism by which the change occurs. Indirect effects are those parts of a variable's total effect that are transmitted through specified intervening variables in the model, whereas direct effects are those parts of a variable's total effect that remain when intervening variables are omitted. Indirect effects are important in identifying intervening variables that mediate between any two variables.

Several approaches were used to evaluate the fit of the model as suggested by Bollen (1989). A Chi-square statistic with degrees of freedom equal to the number of paths fixed to zero was computed and compared to a critical value at the specified level of significance. Other indices used to evaluate the fit of the model included the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), and the root mean residual (RMR). Also examined were the R-squares associated with individual structural equations, the magnitude of the standardized path estimates, and the signs of the path estimates.

Several nested models were compared as suggested by Bollen (1989). A sequence of nested models was compared to the null model. These comparisons were based on the difference in the value of the Chi-square statistics between models.

CHAPTER IV. RESULTS

This chapter presents the results of the statistical analysis of the data. The chapter is divided into three parts. The first part includes a descriptive summary of the background characteristic data from respondents. The analysis of the research constructs, including factor analysis and reliability tests, is presented in the second part of the chapter. Tests of the research hypotheses and the results of the model comparisons are summarized in the third part of the chapter.

Descriptive Summary of Background Characteristic Data

A total of 450 students were initially selected to participate in this study. Four hundred and thirty students completed the survey in group settings. Respondents were all undergraduate male students randomly drawn from one private and two public universities in Kenya. The majority of the students were between 19 and 25 years old and were single. The most predominant religious groups were Protestants and Catholics. A summary of respondents' demographic information is shown in Tables 1-3.

Marital status and number of children desired

A small percentage of those surveyed were married or divorced (5%). The majority of those who were married had at least one child. Respondents were asked to state the number of children they would like to have. Table 4 shows the frequencies of respondent's number of children desired. The median number of children desired was 3.00, the mode was 2.00, and the average was 3.23. The standard deviation was 1.72.

Table 4. Respondent's number of children desired (n = 430).

Number of children desired	n	%
0	6	1.40
1	7	1.60
2	156	36.30
3	112	26.00
4	97	22.60
5	29	6.80
6	7	1.60
7	2	0.50
8	1	0.20
10	11	2.60
12	1	0.20
13	1	0.20
Total	430	100.00

Sources of family planning information

Results show that male university students are exposed to family planning information from a variety of sources. Approximately 90% of the respondents had heard about family planning from at least two sources. As shown in Table 5, the majority of the students said they had read about family planning from somewhere. Of these, over half said they had read about family planning in newspapers or family planning booklets. Posters also seem to be common sources of family planning information for this group as shown in Table 6.

Asked what they had read about, about three quarters of those who had read something on family planning could recall what they had read about.

Table 5. Sources of family planning information (n = 430)

Source of family planning information	n Yes	% Yes
Read about family planning from a source	342	79.50
Listened to radio program about family planning	310	72.10
Heard about family planning from:		
Friends/peers	314	73.00
School	150	34.90
Church	131	30.50
Parents/relatives	118	27.40
Clinic officer	117	27.20
Community leader	100	23.30
Talked to a medical provider about family planning	43	10.00

Table 6. Percentage of respondents who obtained family planning information from a particular printed source (n = 342).

Printed source	n Yes	% Yes
Newspapers	231	67.50
Booklets	214	62.60
Posters	188	54.50
Others (e.g. textbooks, articles, etc.)	81	23.70

Seventy-five percent of those who could recall said they had read about the use of family planning methods. Approximately 20% of the respondents indicated that they had read about the benefits of family planning, whereas a very small proportion said they had read about side effects of family planning methods. See Table 7.

As expected, radio is also a popular source of family planning information for this group. However, when asked what family planning program they had listened to or watched on the TV, only about a third of those who had listened to a radio program could remember the name of the program. Respondents were asked to indicate whether they had talked to a medical service provider or university clinic staff about family planning. Results showed that few students had talked to a medical provider (10%) or a clinic officer (27%) about family planning. However the majority of students (73%) had talked to peers or friends about family planning.

Table 7. Distribution of respondents by type of family planning information read (n = 269).

Type of family planning information	n	%
Use of Methods	202	75.10
Benefits of family planning	53	19.70
Side effects	1	0.40
Other	13	4.80
Total	269	100.00

Contraceptive awareness

In this study, contraceptive awareness of male undergraduate students was assessed by the number of family planning methods a respondent could identify from a list of methods commonly available in Kenya. Condoms, pills, and withdrawal were the most widely known methods of contraception. Norplant, a hormone implant, was the method least known to respondents. Table 8 shows the percentage of respondents who were aware of a particular family planning method.

Table 8. Percentage of respondents who were aware of particular family planning methods (n = 430).

Method	n Aware	% Aware
Condom	430	100.00
Pills	425	98.80
Withdrawal	392	91.20
Rhythm/calendar	375	87.20
Sterilization	373	86.70
Diaphragm	368	85.60
Abstinence	339	78.80
IUD	333	77.40
Foam	303	70.50
Injectables	284	66.00
Traditional methods	224	52.10
Norplant	69	16.00

Vasectomy awareness and knowledge

Awareness of vasectomy among the respondents was very high. Approximately 97% of the respondents reported that they had heard of the operation. Ninety one percent of the respondents were able to identify the method by name. See Table 9. Despite a high level of awareness of vasectomy, only 36 (8%) indicated that they personally knew of a man who had had a vasectomy.

Other items were included in the questionnaire to assess respondent's understanding of vasectomy. Table 9 shows the percentage of respondents who scored correctly on each item. Results showed that most respondents knew that vasectomy does not make a man physically weak, that vasectomy has a high rate of effectiveness, and that the procedure involves blocking the sperm ducts. However, few respondents knew that the procedure takes a short time to perform, that it is inexpensive, and that only one or two follow-ups at the clinic are necessary after the operation. Similarly, many respondents did not seem to know the possible side effects of vasectomy or the time it takes for vasectomy to be effective after the operation.

A knowledge scale was formed by coding the correct answers "1" and incorrect answers "0". A respondent's total score was computed as a percentage of the items scored correctly. See Table 10. Scores ranged from about 16% to 100%. The mean was approximately 59%, the mode was 68%, and the standard deviation was 15.20.

To determine whether knowledge of vasectomy was related to the number of sources from which respondents had heard about family planning, a correlation coefficient was computed. Results showed that those who had heard about family planning from many sources were not necessarily more

Table 9. Respondents' awareness and knowledge of vasectomy (n = 430).

Item no.	Item	n Correct	% Correct
Q9.	Have you heard of an operation that men can have if they wish to have no more children?	416	96.70
Q10.	What is the name of this operation?	392	91.20
Q26.	Does vasectomy make a man physically weak?	389	90.50
Q21.	What do you think is the rate of effectiveness of vasectomy?	360	83.70
Q23.	What does the procedure involve?	351	81.60
Q17.	Is high blood pressure a side effect of vasectomy?	335	77.90
Q28.	Does vasectomy make a man lose sexuality?	315	73.30
Q11.	Do you think vasectomy is a minor or major operation?	271	63.00
Q24	How long do you think one needs to be hospitalized after vasectomy?	260	60.50
Q13.	Do you think vasectomy is more complicated or less complicated than TL?	236	54.90
Q27.	Is it safer for a man to have a vasectomy than it is for a woman to have TL?	222	51.60
Q19.	Is infection a side effect of vasectomy?	200	46.50
Q16.	Is bleeding a side effect of vasectomy?	196	45.60
Q22.	How often do you think one needs to go for follow-up after vasectomy?	187	43.50
Q14.	How long do you think it takes to perform a vasectomy?	178	41.40
Q25.	How much do you think it would cost to have a vasectomy?	169	39.30
Q20.	Is impotence a side effect of vasectomy?	143	33.30
Q18.	Is weight gain a side effect of vasectomy?	97	22.60
Q15.	How long do you think it takes for vasectomy to be effective after the operation is performed?	84	19.50

Table 10. Distribution of respondents' scores on knowledge of vasectomy (n = 430).

Percentage score	frequency	%
34 or Less	30	7.00
35 - 44	50	11.60
45 - 54	90	20.90
55 - 64	107	24.90
65 - 74	102	23.70
75 - 84	45	10.50
85 and over	6	1.40
Total	430	100.00

Overall mean = 58.76
SD = 5.20

knowledgeable about vasectomy than those who had heard about family planning from fewer sources ($r = .04$, $p \geq .05$). However, those who had heard about family planning from printed documents such as textbooks, magazines, or others tended to be more knowledgeable about vasectomy than those who had not heard about family planning from these sources ($t_{(428)} = 2.31$, $p \leq .05$). The relationship between awareness of family planning methods and knowledge of vasectomy was also investigated. Results seem to imply a positive relationship between these two variables. The more methods a respondent was aware of, the more knowledgeable about vasectomy he was likely to be ($r = .26$, $p \leq .05$).

Attitude towards vasectomy

Attitude towards vasectomy was initially measured using 26 items that were scored on a Likert-type scale. The response categories were (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree. Results show that attitude towards vasectomy is slightly positive for this group. The overall mean was 3.50 and the standard deviation was 0.62. The mode and median were 3.77 and 3.50 respectively. Table 11 shows the means and standard deviations of individual items.

An analysis of individual items shows that the majority had means between 3.0 and 4.0. Five items (Q31, Q35, Q36, Q43, and Q45) had means below 3.0, implying that most respondents scored low on these items. It seems that the majority of college males in Kenya feel that sterilization is unethical, that one should not approve of friends having a vasectomy, that family planning should not be the responsibility of the husband, and that a man who has had a vasectomy is neither admirable nor in control of his life.

Eight items (Q34, Q38, Q39, Q42, Q46, Q47, Q49, Q52, and Q54) had means greater or equal to 4.0. For the purposes of comparison, negatively worded items were recoded. Most of the items that had means greater than 4.0 related to the number of children in the family and it seems that majority of the respondents agree on the need to have a small family. It is also interesting to note that this group did not seem to think that vasectomy is a cultural taboo or that it is only for uneducated or poor people.

Table 11. Means and standard deviations of the items measuring respondent's attitude towards vasectomy (n = 430).

Item no.	Item	Mean	SD
Q47.	Vasectomy is for poor people.	4.47	0.94
Q42.	One should plan to have the number of children one can feed.	4.37	1.13
Q39.	Vasectomy is for less educated people.	4.33	1.13
Q38.	There will always be enough resources to go around regardless of the size of the population.	4.30	1.19
Q49.	Having a small number of children makes it easier to raise them properly.	4.29	1.03
Q46.	Parents should not plan when to have children because children are a gift from God.	4.17	1.20
Q34.	A couple should have a child only if they are able to provide for it financially.	4.06	1.29
Q52.	Practicing family planning makes relations between a wife and a husband worse.	4.03	1.13
Q54.	It is good to have a lot of children so that there will be someone to take care of you when you grow old.	4.00	1.12
Q48.	A man who has many children has status in the community.	3.93	1.14
Q33.	A man who has had a vasectomy loses authority in the family.	3.79	1.40
Q29.	Vasectomy is a foreign practice not suitable to Africans	3.56	1.42
Q51.	If it is decided to have no more children, it is the wife's responsibility to use family planning.	3.53	1.17
Q30.	A man who has had a vasectomy loses status in society.	3.37	1.46

Table 11. (Continued).

Item no.	Item	Mean	SD
Q50.	It is all right to recommend vasectomy to a friend who has had all the children he desires.	3.17	1.35
Q41.	Vasectomy is the same as castration.	3.15	1.54
Q37.	A man who considers having a vasectomy cares for the well-being of his family.	3.14	1.32
Q44.	Permanent family planning methods are morally wrong.	3.04	1.42
Q53.	Having a vasectomy is a cultural taboo.	3.04	1.36
Q35.	One should approve of friends having vasectomy.	2.89	1.26
Q36.	It is unethical to use sterilization as a family planning method for human beings.	2.88	1.43
Q43.	A man who has had a vasectomy has control of his life.	2.71	1.22
Q45.	A man who has had a vasectomy is admirable.	2.18	1.03
Q31.	If a married couple decides to have no more children, it is the husbands responsibility to have a vasectomy.	2.14	1.15

Scale: 1 = Strongly disagree, 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.

Overall mean = 3.50, SD =.62

Interest in vasectomy

Ten items were initially used to assess respondent's interest in vasectomy. The response categories were (1) not at all likely, (2) unlikely, (3) somewhat likely, (4) likely, (5) very likely. The overall mean was 3.03 with a standard deviation of .93. Half of the item means were less than 3.00 and none was above 3.60. See Table 12. In general, results indicate low to moderate interest in vasectomy for this group.The majority of the respondents indicated that they would not consider vasectomy as a family planning option in the future, support the use of vasectomy, or seek more information about vasectomy from a clinic provider. However, it is encouraging to note that this group is likely to read material on vasectomy, listen to radio programs on vasectomy, discuss vasectomy with friends, or talk about vasectomy to persons who have had the operation.

Analysis Of the Research Constructs

Validity

A construct is an underlying phenomenon that cannot be directly observed but manifests itself through various indicators (Suen, 1990). DeVellis (1991) observes that , although a construct is not directly quantifiable, it presumably takes on a specific value under some specified set of conditions. In social science research, scales are often developed to estimate the magnitude of a latent variable at a given time for each respondent. Two desirable properties to have in data generated from such scales are validity and reliability. Validity, according to Messick (1989), is an evaluative judgment of the degree to which empirical evidence and theoretical rationales support the accuracy and usefulness of inferences and decisions that are based on measurement scores. In essence

Table 12. Means and standard deviations of items measuring respondent's interest in vasectomy (n = 430).

Item no.	Item	Mean	SD
Q59.	Read a booklet on vasectomy.	3.60	1.22
Q60.	Discuss vasectomy with your friends.	3.55	1.23
Q58.	Listen to a radio program about vasectomy.	3.45	1.26
Q63.	Watch a TV program on vasectomy.	3.41	1.33
Q62.	Talk about vasectomy to a person who has had the operation.	3.29	1.39
Q61.	Attend a workshop or talk on vasectomy.	2.89	1.30
Q56.	Discuss vasectomy with your partner.	2.81	1.42
Q55.	Seek more information about vasectomy from a clinic provider.	2.62	1.34
Q64.	Support the use of vasectomy as a family planning method in an argument with your peers.	2.47	1.38
Q57	Consider vasectomy as a family planning option in future.	2.21	1.34

Scale: 1 = Not at all, 2 = Unlikely, 3 = Somewhat likely, 4 = Likely, 5 = Very likely.

Overall mean = 3.03; SD .=.93.

then, validation constitutes empirical evaluation of the meaning and consequences of measurement. It includes both the intended and unintended consequences of measurement.

Suen (1990) discusses three types of validity-related evidence: content-related evidence, criterion-related evidence, and construct-related evidence. Messick (1989) argues that all types of validity-related evidence can be subsumed under construct validity. In this study, reviewers' evaluations of the instrument provided evidence of the appropriateness of the content of the instrument, whereas construct-related evidence was statistically evaluated using factor analysis.

Separate factor analyses were conducted for each of the research constructs (knowledge, attitude, and interest). In each analysis, principal factor analysis with squared multiple correlations as the communality estimates were performed. A scree test was done to ascertain the number of factors that would be rotated to the Varimax criterion. One advantage of factor analysis is that the method provides a clear conceptual picture of the interrelationships among the items by approximating simple structure. This implies that a subset of items load on a given factor, thus creating a unidimensional latent variable for that factor. It is possible then to establish conceptually what each latent variable represents. The criterion used in retaining factors and developing scales was that an item had to have a factor loading of .40 or higher on the factor and no appreciable cross-loadings. A factor loading is the correlation between an item and the factor on which it loads and a correlation of 0.40 is often considered a reasonable cut-off point (DeVellis, 1991).

Knowledge of Vasectomy Factor analysis of the 26 items used to measure knowledge in vasectomy resulted in six factors as shown in Table 13. Only one item (Q23) failed to load on any factor at the set level. The total amount of variance accounted for by the six factors was 51.8%. All factors had eigenvalues greater than 1.00. Each factor was conceptually interpreted. The first factor reflects both the time and cost advantages associated with having the operation. Factor 2 relates to the simplicity of the procedure compared to tubal ligation. The third factor is related to respondent's awareness of the method, whereas factors four, five, and six relate to misconceptions and rumors, side effects, and technical information about vasectomy, respectively.

Percentage mean scores for each factor were computed and the figures obtained confirm the results obtained earlier. For example, respondents were all highly aware of the method but tended to be poorly informed about possible side effects of the method and the time and cost advantages associated with the procedure. They also did not seem to have a grasp of technical information about the method such as rate of effectiveness and follow-up procedures. All six factors were combined in one scale because they seemed to represent different content areas as well as different cognitive levels. As Crocker and Algina (1986) suggest, items in a knowledge test should focus on various content and process categories relevant to the construct of interest. Therefore a knowledge test need not be unidimensional.

Attitude towards vasectomy Factor analysis of the 26 items used to measure attitude resulted in six factors. After the scree test, three factors accounting for approximately 40% of the variance were retained. The first latent variable was identified as emotional attitude. This corresponds to what Rosenberg

Table 13. Factors, factor loadings, means, and standard deviations of the knowledge construct (n = 430).

Item no.	Factors & items	Mean	SD	Factor loading
	Factor 1:			
	Advantages of vasectomy	47.05	36.06	
Q14.	How long do you think it takes to perform vasectomy?			.73
Q24.	How long do you think one needs to be hospitalized after a vasectomy?			.61
Q25.	How much do you think it would cost to have a vasectomy?			.58
	Factor 2:			
	Simplicity of vasectomy compared to tubal ligation	56.51	36.81	
Q13.	Do you think vasectomy is more complicated or less complicated than tubal ligation, the operation for women who wish to have no more children?			.77
Q27.	Is it saver for a man to have a vasectomy than for a woman to have a tubal ligation?			.75
Q11.	Do you think vasectomy is a major or a minor operation?			.52
	Factor 3:			
	Awareness of vasectomy	93.95	20.73	
Q10.	What is the name of the operation?			.84
Q9.	Have you heard of an operation that men can have if they wish to have no more children?			.83
	Factor 4:			
	Misconceptions & rumors about vasectomy	68.72	25.63	
Q28	A man who has had a vasectomy loses sexuality.			.76
Q26	Vasectomy makes a man physically weak.			.71
Q20	Vasectomy leads to impotence.			.46
Q17	Vasectomy causes high blood pressure.			.41

Table 13. (Continued).

Item no.	Factors & items	Mean	SD	Factor loading
	Factor 5			
	Side effects of vasectomy	38.22	39.97	
Q16	Bleeding is a side effect of vasectomy.			.76
Q19	Infection is a side effect of vasectomy.			.74
Q18	Weight gain is a side effect of vasectomy.			.50
	Factor 6:			
	Medical information about vasectomy	48.92	24.36	
Q15	How long do you think it takes for vasectomy to be effective after the operation is done?			.70
Q21	What do you think is the rate of effectiveness of vasectomy?			.64
Q22	How often do you think one needs to go for follow-up after having a vasectomy?			.52

and Hovland (1960) referred to as the affective domain of attitude. According to Rosenberg and Hovland (1960), the affective domain of attitude involves the sympathetic nervous system and represents a person's emotional feelings towards the attitude object. Nine items loaded on this variable as shown in Table 14. A high score on this variable implies a negative emotional judgment of the method. The overall mean was 2.74 with a standard deviation of 0.98.

The second latent variable was identified as intellectual attitude. Rosenberg and Hovland (1960) referred to this component of attitude as the cognitive domain. They argued that the cognitive domain of attitude could be inferred from respondents' verbal statements of beliefs about the attitude object. Six items

Table 14. Factors, factor loadings, means, and standard deviations of the attitude construct (n = 430).

Item no.	Factors & items	Mean	SD	Factor load.
	Factor 1:			
	Emotional attitude	2.74	.98	
Q33	A man who has had a vasectomy loses authority in the family.			.71
Q32	Having a vasectomy is morally wrong.			.70
Q30	A man who has had a vasectomy loses status in society.			.69
Q44	Permanent family planning methods are morally wrong.			.68
Q36	It is unethical to use sterilization as a family planning method for human beings.			.67
Q53	Having a vasectomy is a cultural taboo.			.64
Q29	Vasectomy is a foreign practice not suitable to Africans.			.61
Q41	Vasectomy is the same as castration.			.56
Q40	Vasectomy encourages promiscuity in men.			.54
	Factor 2:			
	Intellectual attitude	2.71	.81	
Q35	One should approve of friends having vasectomy.			.67
Q37	A man who considers having a vasectomy cares for the well-being of his family.			.63
Q45	A man who has had a vasectomy is admirable.			.62
Q43	A man who has had a vasectomy has control of his life.			.58
Q50	It is all right to recommend vasectomy to a friend who has had all the children he desires.			54
Q31	If a married couple decides to have no more children, it is the husband's responsibility to have a vasectomy.			.53

Table 14. (Continued).

Item no.	Factor & item	Mean	SD	Factor load.
	Factor 3:			
	Masculine Identity	1.97	.83	
Q54	It is good to have a lot of children so that there will be someone to take care of you when you grow old.			.74
Q48	A man who has many children has status in the community.			.72
Q52	Practicing family planning makes relations between a wife and husband worse.			.62
Q46	Parents should not plan when to have children because children are a gift from God.			.57

loaded on this variable. The overall mean was 2.71 with a standard deviation of 0.81. A high score on this variable would imply that a respondent evaluates the method from an intellectual perspective.

The third latent variable was identified as masculine identity. Masculine identity was conceptualized as a cultural phenomenon that relates to men's view of fathering children as a duty to God and society. Isuogo-Abanihe (1994) observes that traditionally, the number of children in a family enhances a man's status in many African societies. The husband, whose obligation generally is to his descendants, therefore decides and dictates the size of the family.

There were four items in the masculine identity variable. A high score on this variable implies that the respondent prefers a large family as a way of expressing his masculine role in society. The overall mean for this variable was 1.97 with a standard deviation of 0.81.

Interest in vasectomy Factor analysis of the ten items used to measure interest resulted in two factors, which accounted for 64% of the variance. Six items loaded on the first factor, whereas four items loaded on the second factor. See Table 15. The first factor was named surface interest in vasectomy and the second factor was named deep interest in vasectomy. The overall mean and standard deviation for the surface interest variable were 3.36 and 1.01 respectively. For the deep interest variable, the mean and standard deviation were 2.51 and 1.11 respectively. Respondent's surface interest in vasectomy was significantly more than their deep interest in the method ($z = 18.34$, $p \leq .05$)

Reliability

Scale reliability, according to DeVellis (1991), is the proportion of variance attributable to the true score of the latent variable. Reliability is therefore a measure of consistency of scores across time. In this study, the internal consistency method was used to assess reliability of the scales created. A scale is internally consistent to the extent that the items in the scale are highly interrelated. Strong inter-item correlations also imply strong links between items and the latent variable. Internal consistency is a further confirmation of the unidimensionality of a latent variable.

To estimate internal consistency, Cronbach's alpha was computed for each of the variables identified in the factor analysis. See Table 16. The surface interest scale had the highest reliability (.86), whereas the knowledge scale had the lowest reliability (.60).

The low reliability of the knowledge scale was expected because the construct was multidimensional. Four items in the knowledge scale (Q15, Q16,

Table 15. Factors, factor loadings, means, and standard deviations for the interest construct (n = 430).

Item no.	Factor & items	Mean	SD	Factor load.
	Factor 1:			
	Surface interest in vasectomy	3.36	1.01	
Q63.	Watch a TV program on vasectomy.			.81
Q58.	Listen to a radio program about vasectomy.			.80
Q59.	Read a booklet on vasectomy.			.79
Q61.	Attend a workshop or talk on vasectomy.			.74
Q60.	Discuss vasectomy with friends.			.69
Q62.	Talk about vasectomy to a person who has had the operation.			.61
	Factor 2:			
	Deep interest in vasectomy	2.51	1.11	
Q57	Consider vasectomy as a family planning option in the future.			.88
Q64	Support the use of vasectomy as a family planning method in an argument with your peers.			.78
Q56	Discuss vasectomy with your partner.			.72
Q55	Seek more information about vasectomy from a clinic provider.			.70

Table 16. Reliability estimates for the scales (n = 430).

Scales	No. items	Cronbach's alpha
Surface interest in vasectomy	6	.8711
Emotional attitude towards vasectomy	9	.8607
Deep interest in vasectomy	4	.8247
Intellectual attitude towards vasectomy	6	.7442
Knowledge of vasectomy	15	.7040
Masculine identity	4	.6872

Q18, and Q19) had low item-total correlations. These items were therefore omitted from the final knowledge scale. Omission of these items raised the reliability coefficient to .70. Typically, a reliability coefficient of .70 or more is considered adequate to study group differences. Elimination of these items did not seriously affect the content-related validity of the scale.

Modified Research Model

Specification of the model

The first step in path analysis is the systematic selection and ordering of variables according to theoretical arguments (Bollen, 1989). In the model proposed initially, the exogenous variables were religious affiliation, age, number of children desired, and sources of family planning information. The endogenous variables were knowledge of vasectomy, attitude towards vasectomy, and interest

in vasectomy in that order. See Figure 2. The model initially proposed was modified based on the results of the factor analysis. See Figure 4. The modified research model is primarily theory driven. It is nested within Rogers' (1983) diffusion of innovation model.

Factor analysis of the interest construct resulted in two unidimensional latent variables. The variables were named "surface interest in vasectomy" and "deep interest in vasectomy". Therefore, in the modified research model, the interest construct was split into two components: "surface interest" and "deep interest". These two variables were specified on the same level in the recursive model.

Factor analysis of the attitude construct resulted in three factors: emotional attitude, intellectual attitude, and masculine identity. Emotional attitude and intellectual attitude were both specified on the same level in the recursive model. They were assumed to precede both surface interest in vasectomy and deep interest in vasectomy. It was hypothesized that emotional attitude towards vasectomy and intellectual attitude towards vasectomy would both have significant influence on surface interest in vasectomy and deep interest in vasectomy. The third factor, masculine identity was specified as an exogenous variable. It was argued that masculine identity is an inherent characteristic that cannot be altered retrospectively (Spence, 1994). Therefore it was assumed that masculine identity was not influenced by other variables in the model.

Knowledge of vasectomy was specified as an endogenous variable as before. It was assumed to precede both emotional attitude towards vasectomy and intellectual attitude towards vasectomy in the model. Knowledge of vasectomy was expected to have significant influence on both emotional attitude towards vasectomy and intellectual attitude towards vasectomy.

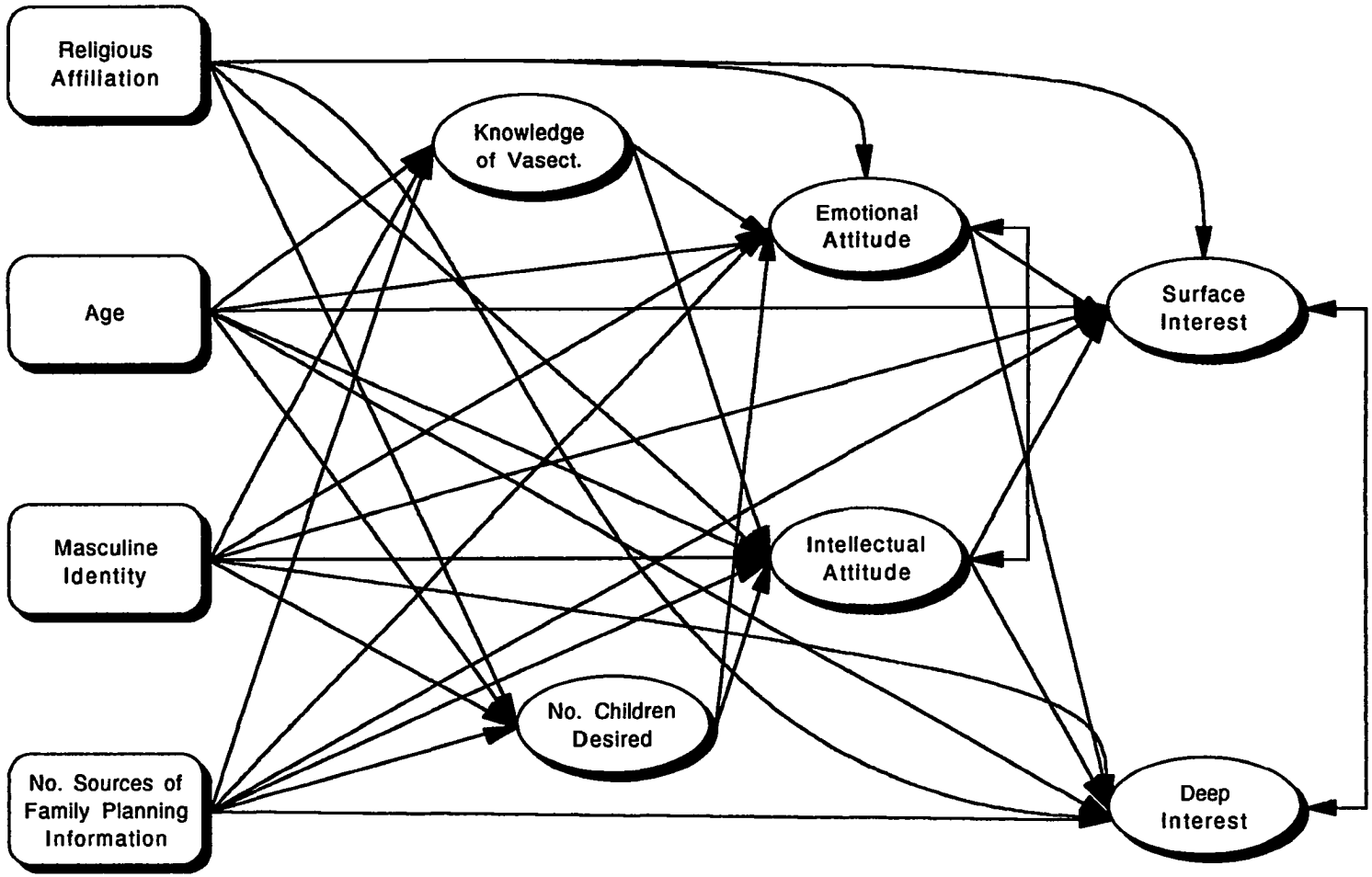

Figure 4. Modified research model.

Number of children desired was specified as an endogenous variable and not as an exogenous variable as in the initial model. The literature indicated that number of children desired is influenced by a number of variables including masculine identity (Isiogo-Abanihe, 1994), age, and number of children in the family (NCPD, 1993). Number of children desired was specified on the same level as knowledge of vasectomy in the recursive model. It was argued that number of children desired should precede both emotional attitude towards vasectomy and intellectual attitude towards vasectomy because it was likely to have significant influence on these variables.

The exogenous variables of the model are respondent's religious affiliation, age, masculine identity, and number of sources of family planning information. These variables are assumed to be inherent characteristics of the population being studied and are therefore not influenced by other variables in the model. They are prior conditions in the adoption-decision process (Rogers, 1983).

in summary, the major changes to the model initially hypothesized are: (1) Splitting the latent variable "interest in vasectomy" into two components: surface interest in vasectomy and deep interest in vasectomy, (2) Splitting the latent variable "attitude towards vasectomy" into three components: emotional attitude towards vasectomy, intellectual attitude towards vasectomy, and masculine identity, (3) Specifying the variable "masculine identity" as a new exogenous variable in the model, (4) Specifying the variable "number of children desired" as an endogenous variable in the model.

For each source of family planning information cited, a respondent was given a score of "1". A respondent's total score on this variable was therefore the total number of sources cited. Religious affiliation was changed into a dichotomous

variable by coding Protestants "1" and Muslims, Catholics, and others, "0". Research has shown that Catholics and Muslims are against the use of vasectomy, whereas Protestants generally support the use of family planning methods (Kasirsky, 1972; Obermeyer, 1994).

Identification of the model

Identification is the process that determines whether it is possible to find a unique solution for the parameters of the model being estimated (Pedhazur, 1982). There are two basic ways of identifying a system of structural equations: (1) Imposing limitations on the coefficients that link the measured variables, (2) Making certain assumptions about the correlations among the residual terms.

To ensure identification in the full recursive model, the following error terms were assumed to be correlated: (1) The residual errors of surface interest in vasectomy and deep interest in vasectomy, (2) The residual errors of emotional attitude towards vasectomy and intellectual attitude towards vasectomy. Further, the coefficients linking "surface interest" and "deep interest" variables and "emotional attitude" and "intellectual attitude" variables were fixed to zero. Correlating the error terms of these variables was deemed necessary because each pair of variables had initially emerged from the factor analysis of a single construct. Each pair of variables would therefore have a spurious correlation. The spurious correlation is assumed to be a consequence of their common causes (Pedhazur, 1982).

Estimating the model

Pearson product-moment correlations were computed for all the variables in the model. See Table 17. The correlation matrix was used to estimate the model. As expected, none of the correlations between pairs of exogenous variables was significant. Multicollinearity was therefore not a problem. The rest of the correlations were low to moderate, but generally significant. These results imply that the specification of the model was reasonable.

To improve the precision of the parameter estimates, the reliabilities of the main constructs of the study were built into the analysis. The computed path coefficients therefore reflect the best estimates of the effects of one variable on another, unconfounded by random measurement error. The error was computed by subtracting Cronbach's alpha reliability coefficient from 1.0 for each of the following variables: deep interest in vasectomy, surface interest in vasectomy, emotional attitude towards vasectomy, intellectual attitude towards vasectomy, and knowledge of vasectomy. The error computed for each of these variables was then incorporated into the analysis. In estimating the modified research model, several null hypotheses were tested.

Testing the Null Hypotheses

Six null hypotheses were tested in this study. The hypotheses were based on the modified research model shown in Figure 4. Table 18 shows the standardized estimates of the path coefficients. Parameter estimates, standard errors, and t-values were examined in making conclusions about the null hypotheses. The results of the hypotheses testing are discussed below.

Table 17. Pearson product-moment correlations among all the variables in the model.

	Variables	1	2	3	4	5	6	7	8	9	10
1.	Religious affiliation	1.0000									
2.	Age	.0140	1.0000								
3.	Masculine identity	-.0583	-.0487	1.0000							
4.	Sources of family planning information	.0732	-.0375	-.0304	1.0000						
5.	Knowledge of vasectomy	-.0415	-.0915	-.2216**	.0288	1.0000					
6.	Number of children desired	-.1199*	-.0162	.2925**	-.0578	-.1461**	1.0000				
7.	Emotional attitude towards vasectomy	-.1358**	-.0056	.3943**	-.1342**	-.2786**	.2591**	1.0000			
8.	Intellectual attitude towards Vasectomy	.0995*	-.0290	-.1639**	-.1318**	-.2695**	-.2606**	-.5805**	1.0000		
9.	Surface interest in vasectomy	.0066	-.0041	-.2399**	-.3018**	.2093**	-.1143*	-.4273**	.4090**	1.0000	
10	Deep interest in vasectomy	.0774	-.0301	-.2153**	.2917**	.1947**	-.1932**	-.5831**	.5680**	.5797**	1.0000

* Significant at .05

** Significant at .01

Table 18. Completely standardized path estimates for the modified research model.

Independent variables	Dependent variable					
	Know. of vasect.	No. children desired	Emotional attitude	Intellectual attitude	Surface interest	Deep interest
Religious affiliation	-	-.100*	-.112*	.088	-.083	-.033
Age	-.121*	-.002	-.019	-.001	.010	-.013
Masculine identity	-.269**	.285**	.309**	-.032	-.111*	-.003
No. sources of FP information.	.022	-.042	-.112*	.122*	.251**	.217**
Knowledge of vasectomy	-	-	-.255**	.320**	-	-
No. children desired	-	-	.129**	-.221**	-	-
Emotional attitude	-	-	-	-	-.196*	-.366**
Intellectual attitude	-	-	-	-	.312**	.461**
Surface interest	-	-	-	-	-	-
Deep interest	-	-	-	-	-	-
R-squared	.085	.098	.288	.209	.362	.686
df.	3/426	4/425	6/423	6/423	6/423	6/423

* Significant at .05
** Significant at .01

Null hypothesis one

Deep interest in vasectomy was not directly affected by respondent's emotional attitude towards vasectomy, intellectual attitude towards vasectomy, religious affiliation, age, masculine identity, or number of sources of family planning information.

Results show that deep interest in vasectomy was influenced directly and significantly by emotional attitude towards vasectomy, intellectual attitude towards vasectomy, and number of sources of family planning information. Specifically, deep interest in vasectomy increased as intellectual attitude towards vasectomy increased and as number of sources of family planning information increased. However, deep interest in vasectomy decreased as emotional attitude towards vasectomy increased. Deep interest in vasectomy was not directly influenced by religious affiliation, age, or masculine identity.

Null hypothesis two

Surface interest in vasectomy was not directly affected by respondent's emotional attitude towards vasectomy, intellectual attitude towards vasectomy, religious affiliation, age, masculine identity, or number of sources of family planning information.

The data obtained show that surface interest in vasectomy was influenced directly and significantly by respondent's emotional attitude towards vasectomy, intellectual attitude towards vasectomy, masculine identity, and number of sources of family planning information. Surface interest in vasectomy increased as intellectual attitude towards vasectomy increased and as number of sources of family planning information increased. Surface interest in vasectomy decreased as

emotional attitude towards vasectomy increased and as masculine identity became high. Surface interest in vasectomy was not directly influenced by respondent's religious affiliation or age.

Null hypothesis three

Respondent's intellectual attitude towards vasectomy was not directly affected by their knowledge of vasectomy, number of children desired, religious affiliation, age, masculine identity, or number of sources of family planning information.

Results show that respondent's intellectual attitude towards vasectomy was influenced directly and significantly by their knowledge of vasectomy, number of children desired, and number of sources of family planning information. Male students who had more knowledge of vasectomy, or had heard about family planning from many sources, were more likely to judge the method from an intellectual perspective. Those who desired a larger family were less likely to judge the method from an intellectual perspective. Respondent's intellectual attitude towards vasectomy was not directly influenced by religious affiliation, age, or masculine identity.

Null hypothesis four

Respondent's emotional attitude towards vasectomy was not directly affected by their knowledge of vasectomy, number of children desired, religious affiliation, age, masculine identity, or number of sources of family planning information.

It was found that respondent's emotional attitude towards vasectomy was

directly and significantly influenced by their knowledge of vasectomy, number of children desired, religious affiliation, masculine identity, and number of sources of family planning information. Respondent's emotional attitude towards vasectomy increased as the number of children desired increased, and as masculine identity became high. Emotional attitude towards vasectomy decreased as knowledge of vasectomy increased and as number of sources of family planning information increased. Protestants had less emotional attitude towards vasectomy compared to Muslims, Catholics, and others. Respondent's emotional attitude towards vasectomy was not directly influenced by their age.

Null hypothesis five

Respondent's knowledge of vasectomy was not directly influenced by their age, masculine identity, or number of sources of family planning information.

Results show that respondent's knowledge of vasectomy was directly and significantly influenced by age and masculine identity. It was not directly influenced by the number of sources of family planning information. Older respondents tended to be less knowledgeable about vasectomy compared to younger respondents. Those who had a higher sense of masculine identity also tended to be less knowledgeable about vasectomy.

Null hypothesis six

Respondent's number of children desired was not directly influenced by their religious affiliation, age, masculine identity, or number of sources of family planning information.

Respondent's number of children desired was directly and significantly influenced by their religious affiliation and masculine identity. Number of children desired was not directly influenced by respondent's age or number of sources of family planning information. Specifically, respondents who had a higher sense of masculine identity tended to desire more children as was expected. Similarly, Catholics, Muslims, and others tended to desire more children compared to Protestants.

Indirect effects

Indirect effects were also computed for the following constructs: emotional attitude towards vasectomy, intellectual attitude towards vasectomy, surface interest in vasectomy and deep interest in vasectomy. Knowledge of vasectomy and number of children desired did not have any indirect effects from any of the variables in the model. See Table 19.

A positive and significant indirect effect was found between masculine identity and emotional attitude towards vasectomy. It appears that the relationship between the two variables is further exaggerated by the desire to have more children. Masculine identity also had a negative and significant indirect effect on intellectual attitude towards vasectomy. This result suggests that masculine identity affects intellectual attitude towards vasectomy through the desire to have more children. Similarly, the total effect of religion on intellectual attitude towards vasectomy became significant when respondent's number of children desired was considered as an intervening variable.

Five variables had significant indirect effects on surface interest in vasectomy. Religious affiliation had a positive and significant indirect effect on

Table 19. Direct, indirect, and total effects for the modified research model (unstandardized solution).

Dependent variable	Independent variables	Direct effect	Indirect effect	Total effects
Knowledge of vasectomy	Age	-.102*	-	-.102*
	Masculine identity	-.226*	-	-.226*
	No. sources of FP information	.018	-	.018
No. children desired	Religious affiliation	-.100*	-	-.100*
	Age	-.002	-	-.002
	Masculine identity	.285*	-	.285*
	No. sources of FP information	-.042	-	.042
Emotional attitude	Religious affiliation	-.104*	-.012	-.116*
	Age	-.018	.028	.010
	Masculine identity	.287*	.098*	.010
	No. sources of FP information	-.104*	-.010	-.114*
	Knowledge of vasectomy	-.282*	-	-.282*
	No. children desired	.120*	-	.120*
Intellectual attitude	Religious affiliation	.075	.019	.094*
	Age	-	-.033	-.033
	Masculine identity	-.028	-.128	-.156*
	No. sources of FP information	.105*	.014	.119*
	Knowledge of vasectomy	.329	-	.329*
	No. of children desired	-.190*	-	-.190*
Surface interest in vasectomy	Religious affiliation	-.077	.055*	-.022
	Age	.009	-.013	-.004
	Masculine identity	-.104*	-.129*	-.232*
	No. sources of FP information	.234*	.063*	.296*
	Knowledge of vasectomy	-	.167*	.167*
	No. of children desired	-	-.088	-.088
	Emotional attitude	-.198*	-	-.198*
	Intellectual attitude	.338*	-	.338*

Table 19. (Continued).

Dependent variable	Independent variables	Direct effect	Indirect effect	Total effects
Deep interest in vasectomy	Religious affiliation	-.028	.083*	.055
	Age	-.011	-.019	-.030
	Masculine identity	-.002	-.203*	-.205*
	No. sources of FP information	.187*	.093*	.280*
	Knowledge of vasectomy	-	.247*	.247*
	No. children desired	-	-.128*	-.128*
	Emotional attitude	-.340*	-	-.340*

surface interest in vasectomy through number of children desired and intellectual attitude towards vasectomy. The negative affect of masculine identity on surface interest in vasectomy was magnified most likely by number of children desired and emotional attitude towards vasectomy. Number of sources of family planning information and knowledge of vasectomy also had positive and significant indirect effects on surface interest in vasectomy through intellectual attitude towards vasectomy. Number of children desired had a negative and significant indirect effect on surface interest in vasectomy through emotional attitude towards vasectomy.

Deep interest in vasectomy was indirectly affected by five variables. Religious affiliation had a positive and significant indirect effect on deep interest in vasectomy. This seems to suggest that either emotional attitude towards vasectomy and number of children desired did not moderate the positive relationship between religion and deep interest as would be expected, or intellectual attitude towards vasectomy enhanced the positive relationship

expected between the two variables. Intellectual attitude towards vasectomy did not seem to suppress the negative effect of masculine identity on deep interest in vasectomy. Instead, number of children desired and emotional attitude towards vasectomy seem to have magnified the negative effect expected between masculine identity and deep interest in vasectomy.

Number of sources of family planning information and knowledge of vasectomy had positive and significant indirect effects on deep interest in vasectomy through intellectual attitude towards vasectomy. Emotional attitude towards vasectomy did not seem to suppress the positive relationship between the two variables as would be expected. Number of children desired had a negative and significant indirect effect on deep interest in vasectomy through emotional attitude towards vasectomy. Contrary to expectations, intellectual attitude towards vasectomy did not moderate the negative relationship between the two variables.

Evaluating the Fit of the Model

An important objective of the structural equation technique is to evaluate whether the research model is consistent with the data. This property, often referred to as model-data consistency, can be tested in a variety of ways (Bollen, 1989). In this study, several indices were used to test for model-data consistency. These indices included the Chi-square statistic with associated p-value, the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the root mean square residual (RMR). Also examined were the R-square for each structural equation and the magnitude and direction of the path estimates.

According to Pedhazur (1982), a significant Chi-square at the specified alpha level implies that the model does not fit the data. A Chi-square with a

probability larger than the specified alpha level implies that the model fits the data. The larger the probability, the better the fit of the model to the data. For the model tested in this study, the Chi-square was computed as 10.42 with 6 degrees of freedom. The probability value was .108 implying that the model was consistent with the data.

Other fit indices indicated a very good fit of the model to the data. The goodness-of-fit index (GFI) was .995, whereas the adjusted goodness-of-fit index (AGFI) was .957. These two indices are a measure of the absolute difference between the observed covariance matrix and the estimated covariance matrix. The closer these two indices are to a value of 1.0, the closer the two covariance matrices and the better the fit of the model to the data. The root mean square (RMS) and the fitted residuals were near zero, also implying a good fit. The summary statistics for the standardized residuals showed a distribution reasonably close to normal.

The path estimates were of the correct directions and, in most cases, of magnitudes that would relatively be expected. The squared multiple correlations for individual structural equations were computed as: .69 for deep interest in vasectomy, .36 for surface interest in vasectomy, .29 for emotional attitude towards vasectomy, .21 for intellectual attitude towards vasectomy, .10 for number of children desired, and .08 for knowledge of vasectomy. The R-squared indicates the proportion of variance in the dependent variable accounted for by the independent variables specified in the structural equation. The relatively small squared multiple correlations for both knowledge of vasectomy and number of children desired indicate that important variables that would predict these variables more effectively exist, but they were not included in the model.

Although most indices discussed so far indicate a model that is consistent with the data, there are two important caveats. First, a good fit of the model to the data may not imply model-reality consistency (Bollen, 1989). In other words, a model that fits the data does not necessarily mirror real-life processes. To assess whether a model reflects reality, one would have to compare the predictions implied by the model to those observed in a context different from that on which the model parameter estimates were based. Secondly, if the model fits the data, it may not imply that one has the best model. Other models that fit the data exist. Elsewhere, others have suggested that a theoretical model should be compared to other nested models before making final conclusions (Bentler & Bonett, 1980; Sobel & Bohrnstedt, 1985). In the discussion that follows, the theoretical model is compared to four other models.

Model Comparisons

The Bentler and Bonett (1980) technique of comparing nested models was used in this study. Bentler and Bonett (1980) developed an index called norm fit index (NFX), which indicates the amount of information gained by moving from a nested model to another, relative to a baseline model. The index is calculated by dividing the difference in Chi-square values of two adjacent models by the Chi-square value of a specified baseline model. Bentler and Bonett (1980) suggested that the null model be used as the baseline model.

Five models including the modified research model, were estimated and compared. See Table 20. First, the null model was estimated with all the path coefficients restricted to zero. The null model had the largest Chi-square value and

Table 20. Model comparisons.

Model	X^2 (df)	P-value	ΔX^2 (df)	Critical value of X^2	Bentler & Bonetts' PRE	Cumulative PRE
Null model	517.52 (37)	.00	-	-	-	-
Baseline model	176.00 (8)	.00	341.41 (29)*	42.60	.66	66
Trimmed model	21.36 (19)	.32	154.75 (18)*	19.70	.30	.96
Modified research model	10.42 (6)	.11	10.94 (13)	22.40	.02	.98
Full model	0.00 (0)	1.00	10.42 (6)	12.60	.02	1.00

* Significant at the .05 level

did not fit the data ($X^2 = 517.52$, $p = .00$). The baseline model was then estimated. In estimating the baseline model, all the hypothesized paths were released but the residual errors between surface interest in vasectomy and deep interest in vasectomy, and between emotional attitude towards vasectomy and intellectual attitude towards vasectomy were not correlated. See Figure 5. The objective of estimating the hypothesized paths without correlating the errors was to verify whether there were spurious correlations between pairs of these variables. The baseline model did not fit the data ($X^2 = 176.11$, $p = .00$). If there were no spurious correlations, the estimated model would most likely have fitted the data. The change in Chi-square from the null model to the baseline model was significant ($\Delta X^2 = 341.41$, $p \leq .05$). Using Bentler and Bonett's (1980) criterion, the Proportion Reduction in Error (PRE) was .66 implying that there was a 66% improvement over the null model.

The third model to be estimated was the trimmed model. The trimmed model had correlated errors and included only those hypothesized paths that were significant. See figure 6. The path coefficients that were not significant in the hypothesized model were set to zero. Pedhazur (1982) defined this model as the over identified model. Helse (1969) had earlier referred to this approach as theory trimming and had argued that this approach results in a model that is economical, realistic, and perhaps more consistent with the data than other models. The change in Chi-square from the baseline model to the trimmed model was significant ($\Delta X^2 = 154.75$, $p \leq .05$). The model also fitted the data well ($p = .32$). The cumulative Proportion Reduction in Error (PRE) was .96 implying that there was a 96% improvement over the null model.

The fourth model to be estimated was the modified research model and as

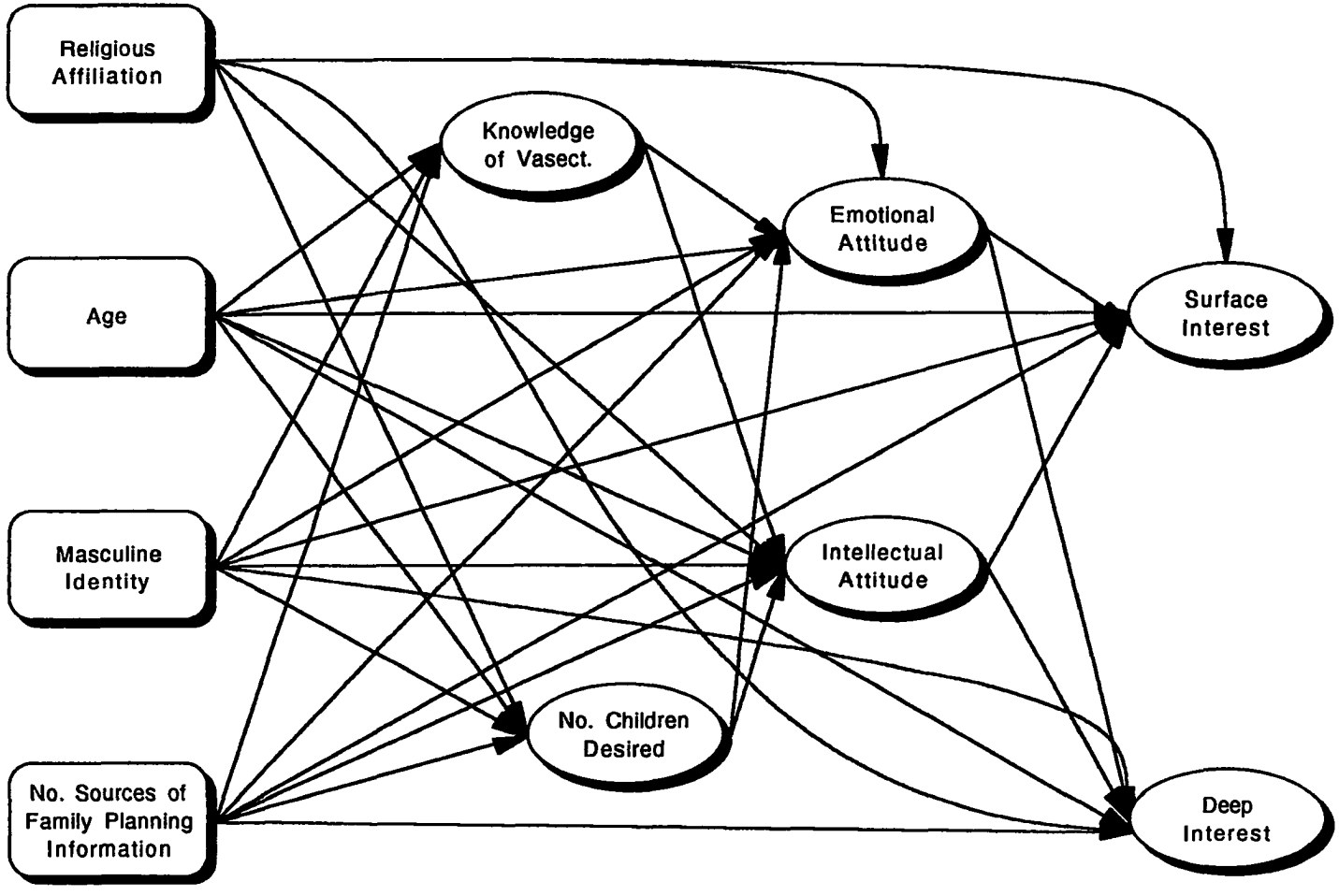

Figure 5. Baseline model (uncorrelated errors).

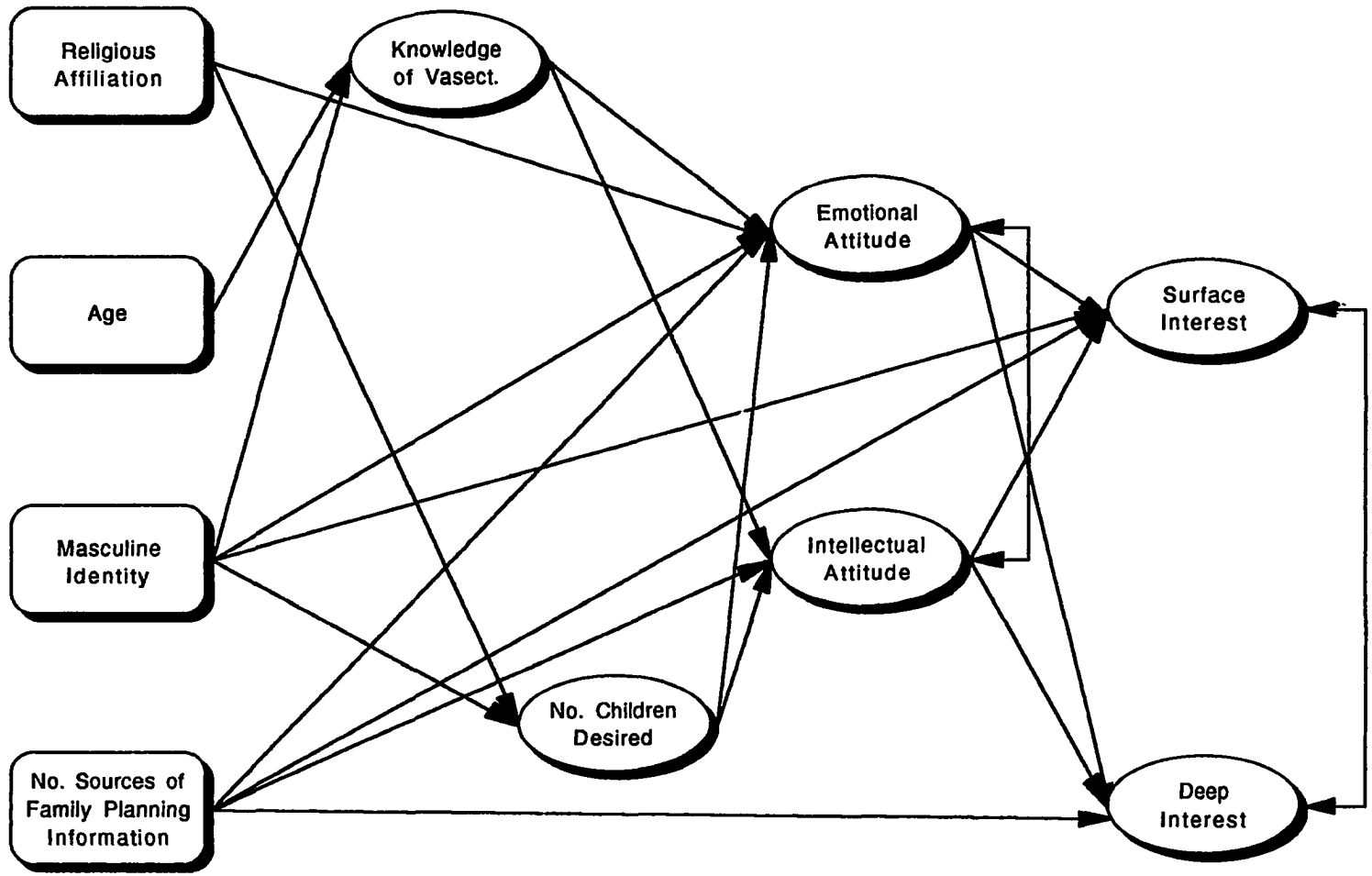

Figure 6. Trimmed model (all paths shown are significant at the .05 level).

discussed earlier, this model fitted the data well ($p = .11$). However, the change in Chi-square from the trimmed model to the modified research model was not significant ($\Delta X^2 = 10.94$, $p \geq .05$). The Proportion Reduction in Error (PRE) was small at .02 implying that there was only a 2% improvement over the trimmed model.

The last model to be estimated was the full recursive model. In the full model all the path coefficients were estimated except for the paths between surface interest in vasectomy and deep interest in vasectomy, and between emotional attitude towards vasectomy and intellectual attitude towards vasectomy. The errors for these pairs of variables were correlated as before. Although the full model fitted the data perfectly ($p = 1.0$), the change in Chi-square from the modified research model to the full model was not significant ($\Delta X^2 = 10.42$, $p \geq .05$). The Proportion Reduction in Error (PRE) was only .02 implying a negligible improvement over the modified research model. The full recursive model was not found to be parsimonious.

In general the modified research model was borne out by results from the LISREL analysis. The goodness of fit indices showed a reasonable fit of the model to the data. The squared multiple correlations for structural equations were reasonable and the magnitudes and direction of path estimates were as expected. However, model comparisons showed that the trimmed model produced the greatest improvement over the null model and it fitted the data better. In addition, the trimmed model supplied the same amount of information as the modified research model but with fewer paths.

Further, analysis of the trimmed theoretical model and the analysis of the modified research model produced similar results. The total coefficient of

determination for structural equations for the trimmed theoretical model was .43. The total amount of variance in each construct explained by the independent variables in the structural equation was 8.6% for knowledge of vasectomy, 9.6% for number of children desired, 26.5% for emotional attitude towards vasectomy, 19.6% for intellectual attitude towards vasectomy, 35.1% for surface interest in vasectomy, and 68.1% for deep interest in vasectomy. The goodness-of-fit index (GFI) was .99 and the root mean square residual (RMS) was .03. The signs of the path coefficients were the same as those obtained in the modified research model. Only minor differences were noted between the magnitudes of corresponding path coefficients of the two models.

Based on results from the LISREL analysis and model comparisons, the trimmed model is perhaps a more plausible model. The trimmed model was therefore considered the "best" model.

CHAPTER V. SUMMARY, DISCUSSION, AND CONCLUSION

Summary and Discussion

Kenya has a young and rapidly growing population (Buren, 1994) and within the last 30 years, much effort has gone towards addressing the problem of high population growth. With the collaboration of other family planning organizations, the Kenya Government has put in place a system of family planning service delivery points that is accessible to most couples (NCPD, 1989). However, existing family planning programs have tended to target women more than men. Men's participation in family planning has remained low. In particular, men's attitudes towards vasectomy have remained uniformly negative (Bertrand *et al.*, 1987; Wilkinson, 1989) and the number of vasectomies performed each year has remained low despite availability of services (NCPD, 1993). Researchers have investigated men's knowledge and attitudes toward vasectomy in Kenya (Mugenda & Mugenda, 1992; Wilkinson, 1989) but no research has been done on the factors that influence knowledge and attitude towards vasectomy during the adolescence years. Because attitudes form early in life and because youth comprise the bulk of the population in Kenya, it is important to delineate these factors before such attitudes became internalized and hence, more difficult to remove later in life.

The purposes of this study were to: (1) Describe male students' awareness of family planning methods, (2) Describe their sources of family planning information, (3) Describe their knowledge of, attitude towards, and interest in vasectomy, and (4) Use factor analysis and structural equation modeling to test a statistical model of factors that influence interest in vasectomy as a family planning method.

Data for this study were collected from 430 respondents randomly selected from two public universities and one private university in Kenya. The respondents were all male undergraduate students in approximately 40 departments. The average age of the respondents was 22.69 years. The majority of the students were Catholics, Protestants, or Muslims.

Marital status and number of children desired

Although the marital and fertility intentions of young adults may be considered tentative at best, an analysis of their marital status and the number of children they would prefer to have in the future may provide a good indication as to their current and future family planning information needs. The analysis may also indicate whether the Government's messages on the need for small families have reached the younger generation. Further, men in African societies have a strong influence on, and in many cases, make the final decision regarding the number of children in the family (Isiogo-Abanihe, 1994). The number of children young people would like to have in the future is important to population planners because it may give an indication of the future size of the Kenyan family.

Although expected, the finding that 95% of the respondents were single may imply that the majority of undergraduate students in Kenya tend to postpone marriage until they graduate. Among those who were married, the majority had at least one child. Even though married students would still be expected to have more children later in life, this result suggests that there is a proportion of college students that is already in need of family planning information and services, especially with regard to birth spacing.

Almost all the respondents indicated that they would like to have a certain number of children demonstrating a prevailing cultural norm in most African societies and Kenya in particular. On average, university male students seem to prefer a family of about three children. The variability in the number of children desired was large implying that a proportion of students would prefer to have many children. These findings are consistent with results from an earlier family planning study of primary and secondary school students in Kenya (Kiragu, 1991).

The average number of children desired for this group is lower than the figure of 3.80 obtained in the 1993 National Survey (NCPD, 1993). However, It should be noted that majority of the respondents in the National Survey were older men aged between 25 and 50 years and the higher average might be due to generation gap. The result however, does indicate a sub-group that will soon be in need of family planning services, particularly with regard to limiting their families to a number perhaps much smaller than that of the families from which they come. The finding may also imply that the younger generation is receptive to the Government's messages on the need for smaller families.

Sources of family planning information

Newspapers, radio, and peers were the leading sources of family planning information for university students. It should be noted that prior to this survey, a number of family planning organizations had actively been promoting family planning on radio and in local papers. The prominence of radio and newsprint as leading sources of family planning information may be due to this intervention.

Family planning information should include all aspects of reproductive health (WHO, 1988). Such information should include use of methods, side effects

associated with the methods, misconceptions about the methods, benefits of the method, and medical facts about the method. Results from this study show that, although the majority of the students read about the use of family planning methods, very few read about side effects, misconceptions, or benefits of family planning methods. The present mechanism of disseminating reproductive health information to young people in Kenya, if there is any, seems to be leaving out important information. Censorship of family planning information and the current debate against the introduction of family life education in schools may also explain the bias in the type of family planning information currently accessible to young people.

Although approximately three quarters of the respondents indicated that they had listened to a family planning program on the radio, it was discouraging to find that only a few students could recall the name of the radio program they had listened to. The current family planning radio and TV programs in Kenya target the older generation and young people may find them uninteresting. There may therefore be a need to design radio and TV programs that are more appealing to young people. Yet again, the issue of whether family planning information should be disseminated to young people may be a hindrance.

The finding that few students talked to a medical service provider or a clinic officer about family planning is consistent with other studies (Mugenda & Mugenda, 1992). This finding may imply that family planning counseling services at university clinics in Kenya are perhaps not utilized much by male students. Traditionally, older relatives instructed the youth on matters of sex and morality but traditions die hard, and old rules have changed without being replaced with new guidelines. Young people therefore seem to turn to their peers for reproductive

health information. In this study, for example, respondents were almost three times as likely to have heard about family planning from their peers than to have heard about family planning from a clinic officer, a community leader, or a relative/parent. Ayo *et al.* (1991) reached similar conclusions in a study on adolescent sexuality and fertility. In that study, it was further observed that family planning information passed among adolescents was not always correct.

Contraceptive awareness

Generally, contraceptive awareness among undergraduate males in Kenya appears to be higher than that of the general population. According to the 1993 National Survey, for example, about 91% of the people surveyed knew about the pill, 81% knew about the condom, 16% knew about withdrawal, and only 4% knew about Norplant (NCPD, 1993). Perhaps university students tend to be much more aware of contraceptive methods because they are exposed to more information during classes, discussions, or in their general reading. In any case, it has already been noted that respondents were likely to have read more about family planning methods than about other aspects of family planning.

However, Kiragu (1991) cautions that contraceptive awareness in Kenya may be negatively related to use among young adults. Among females, for example, those who can name a method are only 35% likely to have used it. The most cited reason for this relationship is that contraceptive methods have undesirable connotations among adolescents who may have many misconceptions about side effects of family planning methods. Therefore, although a young person may have heard of many methods, she or he might often have heard about them in relation to their rumored harmful effects. Thus, young people

may be engaging in sex, but they may be unwilling to use the contraceptives they have heard about.

There is however, no evidence to believe that such a relationship exists for the group surveyed in this study. If anything, results from this study seem to imply a positive relationship between awareness and knowledge; the more methods a respondent is aware of, the more knowledgeable about vasectomy he is likely to be.

The finding that condoms, pills, and withdrawal were the most widely known methods of contraception among undergraduate males was expected. This result is consistent with another family planning study on adolescents (Ayo *et al.*, 1991). The higher awareness of condoms and pills among undergraduates may be an indication that they are the most easily available forms of contraception at university campuses in Kenya. It may also be an indication of family planning counselors' biases toward particular methods during counseling at the university health clinics in Kenya. For example, other studies have found that family planning counselors tend to give more information on pills, condoms, and injectables compared to other methods when counseling new clients (Mugenda & Mugenda, 1991). Providers also tend to recommend these methods more often compared to other methods.

It was not surprising that few students were aware of Norplant. Norplant, a hormone implant, is a relatively new form of family planning method for women. Pre-introduction trials on the method were done in Kenya in the early 1990's and regulatory approval given thereafter. However, Norplant is rarely used in the general population and therefore younger people may not know about it.

Vasectomy awareness and knowledge

Awareness of vasectomy among university students was very high. This greatly contrasts with earlier studies in which the majority of the respondents had not heard of vasectomy (Mugenda & Mugenda, 1992; Wilkinson, 1989). The high level of awareness of vasectomy in this study could be attributed to younger and better educated respondents. Further, the promotion of permanent family planning methods by various organizations and the economic and social changes within the last three years in Kenya could have played a role. The 1993 National Survey, for example, indicated that the percentage of men aware of male sterilization grew from 35% to 56% between 1990 and 1993 (NCPD, 1993) .

It was not surprising that few students personally knew of a man who had had a vasectomy. This low percentage is probably indicative of the low prevalence of vasectomy as a family planning method in Kenya.

The level of knowledge of vasectomy was found to be rather low for a group as educated as this, although respondents in this study were more knowledgeable than those in the 1992 Kenya baseline male survey (Mugenda & Mugenda, 1992) and the 1989 Nairobi male survey (Wilkinson, 1989). Among adolescents, knowledge has been found to rise with increased education (Ayo *et al.*, 1991); and this may explain why this group would exhibit a slightly higher level of knowledge than other groups. In addition, results demonstrate that there is a distinct difference between awareness and knowledge of vasectomy. The university students seemed to be highly aware of vasectomy as a family planning method, but their knowledge of the method was comparably low. Others have made similar observations (Ayo *et al.*, 1991)

Students were poorly informed about the medical and economic benefits of vasectomy. Similarly, many students did not seem to know the possible side effects of vasectomy or the time it takes for vasectomy to be effective after the operation. Young men in Kenya therefore need more information in these areas and future interventions should be geared towards providing such information.

Knowledge of vasectomy was related to the source of family planning information. Compared to other sources, printed materials such as textbooks, magazines, etc. tended to be more effective in disseminating family planning information to young people. This result highlights the evident need to seek out and use a variety of approaches that will both appeal to young people and increase their understanding of reproductive health. This is perhaps the biggest challenge to those who design and implement population policies in Kenya especially now when the debate against family life education is still raging.

Attitude towards vasectomy

In general, it seems that university students agree on the need to have a small family but they do not approve of vasectomy. For example, the majority of students felt that sterilization is unethical, that one should not approve of friends having a vasectomy, and that family planning should not be the responsibility of the husband. At the same time, the majority of students felt that one should have the number of children one can feed and that parents should plan when to have children. One may infer from these results that university students approve of family planning but they do not approve of vasectomy. The results also are compatible with earlier suggestions that young men are receptive to Government's messages on the need for small families, although these same young men do not

seem to consider achieving a small family as their responsibility. The results are similar to those of the National Survey where 90% of married men approved of family planning in general, but approval and intentions to use vasectomy were almost non-existent (NCPD, 1993).

It is also interesting to note that this group did not think that vasectomy is a cultural taboo, that it is for uneducated people, or that it is for poor people. This may be an indication that men's views about vasectomy as a family planning method are beginning to change with the younger generation. Earlier studies found that married men had a negative image of men who had had vasectomy (Mugenda & Mugenda, 1992; Wilkinson, 1989).

Results from the factor analysis of the attitude construct led to some interesting observations. The majority of the undergraduate students in Kenya seemed to have negative intellectual evaluations of vasectomy as a family planning method. Surprisingly, they did not exhibit a high emotional evaluation of the method. This could imply that family planning information that is available to this group may have succeeded in suppressing negative emotional feelings about the method but failed in providing a deeper understanding of the medical and economic benefits of the method. Results from the factor analysis of the knowledge construct support this observation. The data also show that students did not seem to identify with the traditional role of ensuring that there are many children in the family to perpetuate the lineage. It seems that social norms are changing and young people in Kenya no longer consider having many children as a away of enhancing their social and economic status. This should be encouraging to population planners because masculine identity is a culturally-based phenomenon

that is more difficult to influence than awareness, knowledge, or perhaps the intellectual evaluation of vasectomy.

Interest in vasectomy

In general, results indicate low to moderate interest in vasectomy for this group. Only 21% of the respondents said they were likely to consider vasectomy as a family planning option in the future. It is not surprising that the majority of the respondents would not consider vasectomy as a family planning option. This is consistent with recent studies where only 22% (Mugenda & Mugenda, 1992) and 7% (Wilkinson, 1989) of the respondents said they would consider vasectomy as an option in the future. However, these results may support the suggestion that interest in vasectomy has been growing in the last five years in Kenya (NCPD; 1989, 1993).

It is encouraging to note that this group is likely to read material on vasectomy, listen to radio programs on vasectomy, discuss vasectomy with friends, and talk about vasectomy with persons who have had the operation. This indicates a group that maintains an open mind to new practices. It also implies a group that is more likely to judge the method on the basis of available information rather than on the basis of existing social, religious, and cultural norms. However, the finding that this group has a low intellectual evaluation of vasectomy may imply that they are not getting all the family planning information they need.

Results from the factor analysis of the interest construct seem to imply that, although this group exhibits a surface interest in the method, they shy away from activities that imply a likelihood or commitment to use the method in the future. This partly means that men in Kenya are still uncomfortable about being associated with

vasectomy. Family planning campaigns that involve more men who have had the procedure may perhaps reduce this problem. However, these results indicate that a deep commitment to use the method is much more difficult to achieve than casual interest.

The Research Model

The model developed in this study was based on Rogers' (1983) theory of diffusion and adoption of innovation. The model was modified based on the results of the factor analysis. The model identified the theoretical relationships among male students' religious affiliation, age, masculine identity, number of sources of family planning information, knowledge of vasectomy, number of children desired, emotional attitude towards vasectomy, intellectual attitude towards vasectomy, surface interest in vasectomy, and deep interest in vasectomy.

A large portion of variance (69%) in respondent's deep interest in vasectomy was explained by the direct and indirect effects of several variables in the model. Respondents who had heard about family planning from many sources and those who evaluated the method from an intellectual perspective tended to have deeper interest in the method. Those who were emotional about the method were less likely to be interested in the method. These results demonstrate the power of education and information in increasing the acceptance of family planning methods. However, as suggested elsewhere in this study, the effect of information and education on acceptance of family planning methods may be related to the source of that information, content, and mode of dissemination.

Deep interest in vasectomy was not directly influenced by religious affiliation, age, or masculine identity, as would have been expected. However,

religious affiliation, masculine identity, and number of children desired had significant indirect effects on deep interest in vasectomy through emotional attitude towards vasectomy. Respondents who desired more children and those who identified with the masculine role of fathering children, tended be emotional about vasectomy, which in turn led to less interest in the method. Similarly, Muslims and Catholics tended to be emotional about vasectomy, which led to decreased interest in the method. These results are consistent with other studies (Isiogo-Abanihe, 1994; Karsirky, 1972), and they indicate that religion and cultural norms are still powerful factors that influence the acceptance of permanent family planning methods in Kenya (Kanyi, 1984).

Respondents' surface interest in vasectomy was influenced directly and significantly by respondents' emotional attitude towards vasectomy, intellectual attitude towards vasectomy, masculine identity, and number of sources of family planning information. Those who identified with the traditional role of fathering children and those who evaluated the method from an emotional perspective tended to have no surface interest in the method. However, those who had heard about family planning from many sources and those who were intellectual in their evaluation of the method tended to have surface interest in the method.

Five variables had significant indirect effects on surface interest in vasectomy. Religious affiliation positively influenced surface interest in vasectomy through the number of children desired and intellectual attitude towards vasectomy. As would be expected, both the number of children desired and emotional attitude towards vasectomy seemed to magnify the negative effect of masculine identity on surface interest in vasectomy. Number of sources of family planning information and knowledge of vasectomy also had positive and significant indirect effects on

surface interest in vasectomy through intellectual attitude towards vasectomy. Number of children desired had a negative and significant indirect effect on surface interest in vasectomy through emotional attitude towards vasectomy.

Respondents' surface interest in vasectomy appears to be directly and indirectly influenced by the same variables that influence respondents' deep interest in vasectomy. In general, information, cultural norms, and religious beliefs seem to be the dominant factors in determining both respondents' casual interest in the method and their commitment to use the method in the future.

Results showed that respondents' intellectual attitude towards vasectomy was influenced directly and significantly by their knowledge of vasectomy, number of children desired, and number of sources of family planning information. Respondents who had more knowledge of vasectomy and those who had heard about family planning from many sources were more likely to judge the method from an intellectual perspective. Those who desired a larger family were less likely to judge the method from an intellectual perspective. Contrary to expectations, respondents' intellectual attitude towards vasectomy was not directly influenced by religious affiliation, age, or masculine identity. Instead, respondents who strongly identified with the traditional role of fathering children tended to desire more children, which in turn led to less intellectual evaluation of the method. The total effect of religion on intellectual attitude towards vasectomy also became apparent when respondents' number of children desired was considered as an intervening variable.

Respondents' emotional attitude towards vasectomy was directly and significantly influenced by their knowledge of vasectomy, number of children desired, religious affiliation, masculine identity, and number of sources of family

planning information. As was expected, respondents' emotional attitude towards vasectomy increased as the number of children desired increased, and as masculine identity became high. Respondents' emotional attitude towards vasectomy decreased as knowledge of vasectomy increased and as number of sources of family planning information increased. The expectation that Protestants had less intense emotional attitudes toward vasectomy compared to Muslims, Catholics, and others was also borne out by the results. Respondents' emotional attitude towards vasectomy was not directly influenced by their age as hypothesized.

A positive and significant indirect effect was found between masculine identity and emotional attitude towards vasectomy. Respondents who had a higher sense of masculine identity tended to desire more children, which in turn led to more emotional evaluation of the method.

Knowledge of vasectomy was directly and significantly influenced by age and masculine identity. Older respondents and those who had a higher sense of masculine identity tended to be less knowledgeable about vasectomy. Knowledge of vasectomy was not directly influenced by the number of sources of family planning information as hypothesized. This is an interesting finding because it raises important questions regarding the breadth and depth of family planning information available to undergraduate male students in Kenya. The finding supports the suggestion that family planning information available to this group is biased towards certain methods.

The finding that older respondents are less knowledgeable about vasectomy than younger respondents could probably be due to spurious correlation between masculine identity and age. Older men are likely to identify more with the

traditional role of fathering many children, and therefore, they may not be interested in learning about methods that limit the number of children in the family. Contrary to expectations, age did not predict respondents' number of children desired, emotional attitude, intellectual attitude, surface interest, or deep interest in vasectomy. The small variability in the ages of the students surveyed in this study could explain why age was not very effective in the model.

Respondents' number of children desired was directly and significantly influenced by their religious affiliation, and masculine identity. Number of children desired was not directly influenced by respondents' age or number of sources of family planning information. Respondents who identified with the masculine role of fathering children tended to desire more children as was expected. Similarly, Catholics, Muslims, and others tended to desire more children compared to Protestants. These results show the impact of religion and cultural norms on the size of the family in Kenya. The results perhaps also demonstrate the limitation of current family planning programs in moderating the influence of religion and culture on peoples' decisions to plan their families.

Implications and Conclusions

Findings from this study have important implications for both family planning research and the management of family planning programs in Kenya. One important conclusion from this study is that the current approach to the measurement of key variables in family planning research needs to be addressed. The common approach of grouping awareness of family planning methods together with knowledge exaggerates respondents' level of knowledge. Therefore, family planning programs that are planned on the bases of such results may not be

meeting their clients' informational needs. Findings from this study reiterate the distinct difference between awareness and knowledge and lead one to conclude that awareness alone is not enough to induce use, as others have observed (Kiragu, 1991). Respondents in this study, although well-educated and highly aware of vasectomy, were poorly informed about the method. It is suggested that a more accurate approach to the measurement of knowledge of family planning methods should include knowledge items that focus on various content and process categories of the construct. Such items should also cover different difficulty levels.

Measurements of attitude towards and interest in family planning methods also need to be addressed. In this study, factor analysis of the attitude construct resulted in three factors: emotional attitude, intellectual attitude, and masculine identity. Therefore, attitude is not a unidimensional construct as is often assumed in many family planning studies. Breaking the attitude construct into unidimensional factors and using appropriate number of indicators in each latent factor gives a more accurate picture of respondents' attitudes toward family planning methods. The application of this approach revealed interesting characteristics among university students that would otherwise have been difficult to isolate. Although university students seem to be less emotional about vasectomy and although they do not identify strongly with the traditional masculine role of having many children, they do not necessarily evaluate the method rationally, possibly because of a lack of knowledge about the method.

Results from this study show that interest in a particular family planning method is also not a unidimensional construct. Decomposing the interest construct into unidimensional factors gives a true picture of respondent's commitment to use

the method. This is particularly important when discussing men's participation in family planning. Even though the majority of men approve family planning methods and a good proportion express the belief that men should assume or share the responsibility of family planning, a far smaller proportion of men in Kenya is doing so (NCPD, 1993; Ringheim, 1993). Perhaps what other studies have classified as approval and interest in vasectomy has only been a surface interest in the method. Such a measure does not give an accurate indication of the future demand for family planning services.

The poor measurement of knowledge of, attitude towards, and interest in family planning methods could explain the great disparity between knowledge and prevalence of family planning methods reported in many KAP studies. Accurate measurements of knowledge of, attitude towards, and interest in family planning methods would give an accurate indication of future prevalence of methods. Accurate forecasts of future demand for family planning services would be of great utility to program managers and population policy makers who must provide adequate family planning services in the future.

Results from this study support the use of the theory of diffusion and adoption of innovation as applied in many family planning studies. The theoretical argument that personal characteristics and awareness and knowledge of a method influence attitude towards the method, which in turn influences intentions to use the method, was borne out by the data. In this study, the variables that seemed to have the strongest influence on attitudes toward and interest in vasectomy are religious and cultural factors on one hand, and information and education on the other.

Religious affiliation, masculine identity, and number of children desired seemed to encourage emotional evaluation of vasectomy. Emotional evaluation of

vasectomy led to reduced interest in vasectomy. Family planning information and increased knowledge of vasectomy led to more intellectual evaluation of vasectomy. Intellectual evaluation of vasectomy raised interest in vasectomy. It may be generalized that religious and cultural factors hinder the use of vasectomy, whereas information and education encourage its use.

Lack of a significant positive relationship between number of sources of family planning information and knowledge of vasectomy is discouraging because it reveals gaps in the type of information on family planning methods provided to the public. This calls for the implementation of family planning information, education, and communication programs (IEC) that provide accurate information to various subgroups of the population. Although there are people who are currently opposed to the provision of family planning information to youth in Kenya, pilot studies that determine the ideal age of recipients of such information, content of the materials, and mode of communication would shed light on how such programs would be implemented with minimum unintended consequences.

The first step in implementing any information, education, and communication (IEC) program to young people in Kenya is to provide complete and accurate information about vasectomy. Such information should include the medical and cost benefits of the method, its simplicity, and other relevant medical facts. At the same time, it would be important to address and dispel the fears and misconceptions that young men seem to have about vasectomy. Fears about side effects and loss of sexuality can easily be overcome through education.

However, information may not be able to address moral or religious beliefs. Beliefs that vasectomy is sinful, immoral, or that it violates religious and cultural norms are personal values which are often very sensitive. It would therefore be

unrealistic to expect people to change within the time-span of a family planning program. Nevertheless, program managers need to be aware of these factors and they should be sensitive to clients' beliefs during counseling. Although cultural norms may be difficult to influence through education, it should be noted that traditions change overtime and vasectomy is likely to gain acceptance once there is a critical mass of adopters.

This study also suggests that vasectomy promotion campaigns should not be targeted at just middle-aged, blue color men with large families as is sometimes the case. The data suggest that educated young men prefer small families and therefore vasectomy should be made an option for them once they have had all the children they desire. This may also be the case with other subgroups in the population that have often been excluded from family planning research.

Recommendations for Future Research

- Findings of this study should be validated by conducting further research on similar samples of undergraduates using the same instrument.
- The model tested in this study should be validated using data from a different population. Such studies should use a large number of respondents so that cross-validation can be done by dividing the sample into two and using one half of the sample to validate the results of the other.
- Further research is needed to test models with different causal structures. This will provide additional information regarding the relationships among the variables that predict peoples' propensity to use family planning methods. Examining the effect of personal and external factors that lead to the adoption of

family planning methods will help in improving counseling services to meet clients' needs.

- Future research in the adoption of vasectomy should focus on other subgroups of the population. For example, research is needed on the knowledge of and attitude towards vasectomy among males who are in leadership positions including political leaders, administrators, Church leaders, etc. It would also be important to obtain views from male service providers and medical doctors.
- The quantitative approach was used in this study. Future research should combine qualitative research with quantitative research. Qualitative research involves the interaction between the respondent and the researcher and allows the perspectives of the respondent to emerge from the discussion. It is only through such interaction that more accurate data on the effect of religious and cultural values on adoption of vasectomy could be collected.
- Small group in-depth studies that elaborate on the findings of this study should be done on different university campuses in Kenya. Such groups should be limited to about 10 respondents per group to allow a thorough discussion of the subject.
- Data collected through self-administered questionnaires is of fairly good quality when the respondents are as educated as those surveyed in this study. However, to obtain reliable data on this subject from less educated respondents, researchers should use the interview method.
- Research on the available family planning services at university health clinics is needed. Such research should explore the programs that exist at each campus for the dissemination of family planning information and services and the rate at which such services are utilized.

- Given that the majority of young people in Kenya obtain reproductive health information from their peers, research should be done on the use of youth-oriented programs, such as the peer counseling program, to disseminate accurate reproductive health information at university campuses. In light of the current AIDS epidemic, reproductive health education for young people in Kenya is now more important than ever before.

REFERENCES

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. New York: Prentice-Hall, Inc.

Allen, I. (1985). Counselling services for sterilization, vasectomy, and termination of pregnancy. London: Policy Studies Institute.

Allport, G. (1935). Attitudes. In C. Murchison (Ed.), Handbook of social psychology (pp. 798-884). Worchester, MA: Clark University Press.

Alwin, D. F., & Houser, R. M. (1975). The decomposition of effects in path analysis. American Sociological Review, 40, 37-39.

Aruasha, R. (1989, July). Vasectomy: Men fear castrated bull tag. The Standard, p. 5.

Asamoah, Y. (1988). Program evaluation in Africa. Evaluation and Program Planning, 11, 169-177.

Ayo, A., Marangu, L., Miller, J., & Paxman, J. (1991). Adolescent sexuality and fertility in Kenya: A survey of knowledge, perceptions, and practices. Studies in Family Planning, 22 (4), 205-216.

Bailey, A., Patricia, M. P., Castro, A., Arujo, M., Castro, B., & Janowitz, B. (1991). Physicians' attitudes, recommendations, and practice of male and female sterilization in Sao Paulo. Contraception, 44 (2), 192-207.

Bankole, A., & Olaleye, O. D. (March, 1993). Do marital partners have different reproductive preference in sub-Saharan Africa? Paper presented at the International Union for the Scientific Study of Population Seminar on Women and Demographic Change in sub-Saharan Africa. Dakar, Senegal.

Barker, K. G., & Rich, S. (1992). Influences on adolescents sexuality in Nigeria and Kenya: Findings from recent focus-group discussions. Studies in Family Planning, 23 (3), 199-210.

Bem, S. L. (1981). Sex-role inventory. Palo-Alto: Consulting Psychology Press.

Bentler, P., & Bonett, D. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606.

Bertrand, J., Mathu, N., Dwyer, M., Thuo, M., & Wambwa, G. (1989). Attitudes towards voluntary surgical contraception in four districts of Kenya. Studies in Family Planning, 20, 281-287.

Bhagwut, D. (1994). United Nations International Conference on Population and Development. Connect: UNESCO-UNEP Environment Education, 19 (4), 1-3.

Block, J. H. (1984). Sex-role identity and ego development. San Francisco: Jossey-Bass.

Bollen, A. K. (1989). Structural equations with latent variables. New York: John Wiley & Sons.

Borg, W. R., & Gall, M. D. (1989). Educational research. New York: Longman.

Brown, L. A. (1981). Innovative diffusion, a new perspective. New York: Lawrence A. Brown.

Buren, L. V. (1994). Africa south of the Sahara. London: Europa Publications Limited.

Central Bureau of Statistics. (1992). Kenya statistical abstracts. Nairobi: Government Printers.

Crocker, L., & Algina, J. (1986). Introduction to classical and modern test theory. New York: Harcourt Brace Jovanovich College Publishers.

DeVellis, R. F. (1991). Scale development. Newbury: Sage Publications.

Downs, G. W., & Mohr, B. (1976). Conceptual issues in the study of innovation. Administration Sciences Quarterly, 21, 700-714.

Ferguson, A. G. (1992): Fertility and contraceptive adoption and discontinuation in rural Kenya. Studies in Family Planning, 23, 257-267.

Fisher, A., Laing, J., & Stoeckel, J. (1983). Handbook for family planning operations research design. New York: The Population Council.

Fuller, G. (1974). On the spatial diffusion of fertility decline. The distance-to-clinic variable in a Chilean community. Economic Geography, 50, 424-432.

Gleave, M. B. (1993). The African condition. In M. B. Gleave (Ed.), Tropical African development. New York: John Wiley.

Guess, H. (1990). Vasectomy and prostate cancer. American Journal of Epidemiology, 132, 1062-1065.

Guba, E. G., & Lincoln, S. Y. (1983). Epistemological and methodological bases of naturalistic inquiry. In G. F. Madaus, M. Scriven, & D. L. Stufflebeam (Eds.), Evaluation models (pp. 311-333). Boston: Kluwer-Nijhoff Publishing.

Helse, D. R. (1969). Problems in path analysis and causal inference. In E. F. Borgatta, & G. W. Bohrnstedt (Eds.), Sociological methodology (pp. 38-73). San Francisco: Jossey-Bass.

Isiogo-Abanihe, U. C. (1994). Reproductive motivation and family size preferences among Nigerian men. Studies in Family Planning, 25 (3), 149-161.

James, B. (1994, September). A crisis of numbers. West Africa, p. 1511.

Joreskog, K. G., & Sorbom, D. (1989). LISREL7. A guide to the program and application. Chicago: SPSS, Inc.

Kanyi, J. (1984). Male vasectomy as an option in sub-Saharan Africa. A paper presented at the conference on reproductive health management in sub-Saharan Africa. Freetown, Sierra-Leone.

Kasirsky, G. (1972). Vasectomy, manhood, and sex. New York: Springer Publishing Company, Inc.

Khasiani, S. A. (1985). Adolescent fertility in Kenya with special reference to high school teenage pregnancy and childbearing. Nairobi: Pathfinder Fund.

Kigondu, J. G. (1986). The organization of family planning services for adolescents in Kenya. Paper presented at a workshop on adolescent fertility in Kenya, Kwale, Kenya.

Kiragu, K. (1991). The correlates of sexual and contraceptive behavior among in-school adolescents in Kenya. Unpublished doctoral dissertation, The Johns Hopkins University, Baltimore, Maryland.

Klem, L. (1995). Reading and understanding multivariate statistics. Washington, D. C.: American Psychological Association.

Lema, J. (1987). A study to determine the knowledge, attitudes, and use of contraceptives with relation to sexual knowledge and behavior among adolescent secondary school girls in a cosmopolitan city in Africa. Unpublished doctoral dissertation, University of Nairobi, Nairobi, Kenya.

London, L. (1988). Change agents. London: Jossey-Bass Publishers.

Lynn, R. K. (1984). Attitudes and social change. New York: Pergamon.

Marshall, J. (1977). Acceptability of fertility regulating methods: Designing technology to fit people. Preventive Medicine, 6, 65-75.

McCown, R. L., & Keating, B. A. (1992). Looking forward: Finding a path for sustainable farm development. In M. C. Probert (Ed.), A search for strategies for sustainable dryland cropping in semi-arid eastern Kenya. Nairobi: Kenya Agricultural Research Institute.

Mcquire, W. K. (1989). The structure of individual attitudes and systems. In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), Attitude structure and function. Hillsdale: Lawrence Erbaum Associates.

Messick, S. (1989). Validity. In R. L. Linn (Ed.), Educational measurement (pp. 13-104). New York: Macmillan.

Mettlin, C., Natarajan, N., & Huben, R. (1990). Vasectomy and prostate cancer risk. American Journal of Epidemiology, 132, 1056-1061.

Mugenda, O., & Mugenda, A. (1991). A baseline situation analysis of family planning provider and client IEC in Kenya. Unpublished report, Nairobi, Kenya.

Mugenda, O., & Mugenda, A. (1992). Kenyan baseline vasectomy survey. Unpublished report, Nairobi, Kenya.

Mumford, S. (1983). The vasectomy decision-making process. Studies in Family Planning, 14, 83-88.

National Council for Population and Development. (1989). The Kenya demographic and health survey. Nairobi: Office of the Vice-President and Ministry of Planning and National Development.

National Council for Population and Development. (1993). The Kenya demographic and health survey. Nairobi: Ministry of Home Affairs and National Heritage.

National Research Council. (1993). Factors affecting contraceptive use in sub-Sahara Africa. Washington, D.C.: National Academy Press.

Nelson, H. D. (1984). Kenya, a country study. Washington, D. C.: American University.

Ng'weno, H. B. (1993, September). Multiply and fill the earth. The Weekly Review, pp. 15-17.

Ng'weno, H. B. (1994, December). Sex war. The Weekly Review, pp. 4-10.

Obermeyer, C. M. (1994). Reproductive choice in Islam: Gender and state in Iran and Tunisia. Studies in Family Planning, 25 (1), 41-51.

Oniang'o, R. K., & Rogo, K. (1986). Sexual maturation and fertility issues among high school males. Paper presented at a workshop on adolescent fertility in Kenya, Kwale, Kenya.

Pedhazur, E. J. (1982). Multiple regression in behavioral research. New York: Holt, Rinehart, and Winston.

Population Information Programs. (1990). Condoms—now more than ever. Population, Reports, 18 (3), 1-20.

Population Information Program. (1992). Vasectomy: New opportunities. Population Reports, 20 (1), 1-21.

Population Information Program. (1994). Thirty years of family planning programs. Population Reports, 22 (40), 3-25.

Probert, E. (1992). A search for strategies for sustainable dryland cropping in semi-arid eastern Kenya. Nairobi: Kenya Agricultural Research Institute.

Ringheim, K. (1993). Factors that determine prevalence of use of contraceptive methods for men. Studies in Family Planning, 24, 87-99.

Rogers, E. M. (1983). Diffusion of innovation. New York: Free Press.

Rogers, E. M., & Shoemaker, F. F. (1971). Communication of innovations. New York: The Free Press.

Rosenberg, M. J., & Hovland, C. I. (1960). Attitude organization and change. New Haven: Yale University Press.

Sobel, M., & Bohrnstedt, G. (1985). Use of the null models in evaluating the fit of covariance structure models. In N. B. Tuma (Ed.), Sociological methodology, (pp. 152-178). San Francisco: Jossey-Bass, Inc.

Spence, W. R. (1994). Innovation: The communication of change in ideas, practices, and products. London: Chapman & Hall.

Stycos, M. J., Sayed, H., Avery, R., Fridman, S. (1988). Community development and family planning: An Egyptian experiment. London: Westview Press.

Suen, K. H. (1990). Principles of test theories. Hillsdale: Lawrence Erlbaum Associates, Publishers.

Sujono, H. (1974). The adoption of an innovation in a developing country: the case of family planning in Indonesia. Chicago: Chicago University of Community and Family Studies Center.

Tinsley, H., & Tinsley, J. (1987). Uses of factor analysis in counseling psychology research. Journal of Counseling Psychology, 34 (4), 414-424.

United Nations. (1990). Demographic yearbook. New York: United Nations.

United Nations Population Fund. (1993). The state of world population. New York: United Nations.

Vernon, Ricardo, Ojeda, G., & Vega, A. (1991). Making vasectomy services more acceptable to men. International Family Planning Perspectives, 17 (2), 55-60.

Wilkinson, D. J. (1989). A survey of urban male attitudes toward vasectomy. Nairobi: Population and Health Services.

William, J., & Cogswell, L. (1991). Communication process for behavior adoption and research synthesis. Paper presented at the IEC Working Group Workshop, Nairobi, Kenya.

Women Bureau. (1991). Family planning and status of women in Kenya. Nairobi: Ministry of Culture and Social Services.

World Bank. (1994). Adjustment in Africa, lessons from country case studies. Washington, D. C. World Bank.

World Health Organization. (1988). Technical and managerial guidelines for vasectomy services. Geneva: World Health Organization.

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APPENDIX A:
SURVEY INSTRUMENT

INSTRUCTIONS: Please check the appropriate response or provide the information requested.

1. What is your department? _____

2. What is your year of study in college?

1.....First.
2..... Second.
3.....Third.
4.....Fourth
5.....Fifth.
6.....Sixth.

3. What is your age? _____Years.

4. What is your marital status?

1.....Single. **(Go to Q6).**
2.....Married. **(Go to Q5).**
3.....Separated. **(Go to Q5).**
4.....Divorced. **(Go to Q5).**

5. How many children do you have? _____

6. What is your religion?

1.....Hindu.
2.....Protestant.
3.....Islam.
4.....Catholic.
5.....African Traditional religion.
6.....Other(specify)_____
7.....No Religion.

7. How many children would you wish to have? _____

8. What family planning methods have you heard about? **(Check all that apply).**

01.....Pills.
02.....Injectables.
03.....IUD.
04.....Foam.
05.....Diaphragm.
06.....Condom.
07.....Sterilization.
08.....Norplant.
09.....Withdrawal.
10.....Rhythm/Calendar.
11.....Traditional methods.
12.....Abstinence.
13.....Other(Specify).____

9. Have you heard of an operation that men can have if they wish to have no more children?

1.....Yes. **(Go to Q 10).**
2.....No. **(Go to Q11).**

10. What is the name of this operation?

    1. _____
    2. Don't know/Can't remember.

11. Vasectomy is an operation for men who wish to be sterile just like tubal ligation is an operation for women who wish to be sterilized that is, they wish to have no more children. Do you think vasectomy is a major or minor operation?

    1.....Minor
    2.....Major.

12. Do you know any one who has had a vasectomy?

    1.....Yes.
    2.....No.

13. Do you think vasectomy is more complicated or less complicated than tubal ligation, the operation for women who wish to have no more children?

    1.....Less complicated.
    2.....More complicated.
    3.....The same.

14. How long do you think it takes to perform a vasectomy?

    1.....Less than 30 minutes.
    2.....30-60 minutes.
    3.....More than 60 minutes.

15. How long do you think it takes for vasectomy to be effective after the operation is performed?

    1.....It is effective immediately.
    2.....One day.
    3.....One to two months.

Vasectomy is known to have certain side effects. Which of the following conditions (Q16-Q20) do you think are possible side effects of vasectomy?

16. Bleeding. 1.....Yes. 2.....No.

17. High blood pressure. 1.....Yes. 2.....No.

18. Weight gain. 1.....Yes. 2.....No.

19. Infection. 1.....Yes. 2.....No.

20. Impotence 1.....Yes. 2.....No.

21. What do you think is the rate of effectiveness of vasectomy?

1.....50%.
2.....80%.
3.....99%.

22. How often do you think one needs to go for follow-up after having a vasectomy?

1.....One or two check-ups only.
2.....Once every three months for two years.
3.....Every month for two years.

23. Vasectomy is a surgical procedure that involves:

1.....Removal of sperm ducts.
2.....Blocking of sperm ducts.
3.....Removal of prostate gland.

24. How long do you think one needs to be hospitalized after a vasectomy?

1.....Hospitalization is not necessary.
2.....One day.
3.....2-3 days.

25. How much do you think it would cost to have a vasectomy?

1.....Less than KShs. 500.
2.....KShs. 500-1000.
3.....Over KShs. 1000.

From your own understanding, are the following statements (Q26-Q28) true or false?

26. Vasectomy makes a man physically weak.

1...True.
2...False.

27. It is safer for a man to have a vasectomy than for a woman to have a tubal ligation.

    1...True.
    2...False.

28. A man who has had a vasectomy loses sexuality.

    1...True.
    2...False.

For the following statements (Q29-Q54), indicate whether you: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

29.	Vasectomy is a foreign practice not suitable to Africans.	1 2 3 4 5
30.	A man who has had a vasectomy loses status in society.	1 2 3 4 5
31.	If a married couple decides to have no more children, it is the husband's responsibility to have a vasectomy.	1 2 3 4 5
32.	Having a vasectomy is morally wrong.	1 2 3 4 5
33.	A man who has had a vasectomy loses authority in the family.	1 2 3 4 5
34.	A couple should have a child only if they are able to provide for it financially.	1 2 3 4 5
35.	One should approve of friends having vasectomy.	1 2 3 4 5
36.	It is unethical to use sterilization as a family planning method for human beings.	1 2 3 4 5
37.	A man who considers having a vasectomy cares for the well-being of his family.	1 2 3 4 5
38.	There will always be enough resources to go around regardless of the size of the population.	1 2 3 4 5

39.	Vasectomy is for less educated people.	1 2 3 4 5
40.	Vasectomy encourages promiscuity in men.	1 2 3 4 5
41.	Vasectomy is the same as castration.	1 2 3 4 5
42.	One should plan to have the number of children one can feed.	1 2 3 4 5
43.	A man who has had a vasectomy has control of his life.	1 2 3 4 5
44.	Permanent family planning methods are morally wrong.	1 2 3 4 5
45.	A man who has had a vasectomy is admirable.	1 2 3 4 5
46.	Parents should not plan when to have children because children are a gift from God.	1 2 3 4 5
47.	Vasectomy is for poor people.	1 2 3 4 5
48.	A man who has many children has status in the community.	1 2 3 4 5
49.	Having a small number of children makes it easier to raise them properly.	1 2 3 4 5
50.	It is all right to recommend vasectomy to a friend who has had all the children he desires.	1 2 3 4 5
51.	If it is decided to have no more children, it is the wife's responsibility to use family planning.	1 2 3 4 5
52.	Practicing family planning makes relations between a wife and a husband worse.	1 2 3 4 5
53.	Having a vasectomy is a cultural taboo.	1 2 3 4 5

54. It is good to have a lot of children so that there will be someone to take care of you when you grow old. 1 2 3 4 5

Use the following scale to answer the questions that follow (Q55-Q64): Not at All (1), Unlikely (2), Somewhat likely (3), Likely (4), Very Likely (5)

How likely are you to:

55. Seek more information about vasectomy from a clinic provider? 1 2 3 4 5

56. Discuss vasectomy with your partner? 1 2 3 4 5

57. Consider vasectomy as a family planning option in future? 1 2 3 4 5

58. Listen to a radio program about vasectomy? 1 2 3 4 5

59. Read a booklet on vasectomy? 1 2 3 4 5

60. Discuss vasectomy with your friends? 1 2 3 4 5

61. Attend a workshop or talk on vasectomy? 1 2 3 4 5

62. Talk about vasectomy to a person who has had the operation? 1 2 3 4 5

63. Watch a TV program on vasectomy? 1 2 3 4 5

64. Support the use of vasectomy as a family planning method in an argument with your peers? 1 2 3 4 5

65. Within the last one year, have you listened to a family planning program on the radio or TV?

1.....Yes **(Go to Q66).**
2.....No **(Go to Q67).**

66. What was the name of the program you listened to/watched?

1._____
2. Don't know/Can't remember.

67. Within the last six months, have you read anything about family planning?

1.....Yes **(Go to Q68).**
2.....No **(Go to Q70).**

68. Where did you read about family planning? **(Check all that apply).**

1.....Poster.
2.....Newspaper.
3.....Family planning booklet/leaflet.
4.....Other(specify) _____

69. What is it that you read about?

1_____
2. Don't know/Can't remember.

70. Have you ever talked to a medical service provider about family planning?

1.....Yes.
2.....No.

71. Within the last six months, have you heard anything about family planning from the following sources? **(Check all that apply).**

1.....School.
2.....Clinic/Health center.
3.....Church.
4.....Community leader.
5.....Parents/Relatives.
6.....Friends.
7.....Other(specify)_____

APPENDIX B:

HUMAN SUBJECTS APPROVAL FORMS

Last Name of Principal Investigator Mugenda.

Checklist for Attachments and Time Schedule

The following are attached (please check):

12. [X] Letter or written statement to subjects indicating clearly:
    a) purpose of the research
    b) the use of any identifier codes (names, #'s), how they will be used, and when they will be removed (see Item 17)
    c) an estimate of time needed for participation in the research and the place
    d) if applicable, location of the research activity
    e) how you will ensure confidentiality
    f) in a longitudinal study, note when and how you will contact subjects later
    g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. [X] Consent form (if applicable)

14. [ ] Letter of approval for research from cooperating organizations or institutions (if applicable) See note under item 11H

15. [X] Data-gathering instruments

16. Anticipated dates for contact with subjects:

First Contact	Last Contact
2-15-95	5-15-95
Month / Day / Year	Month / Day / Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

_____
Month / Day / Year

18. Signature of Departmental Executive Officer | Date | Department or Administrative Unit

Daniel C. Robins | 1-30-95 | BED

19. Decision of the University Human Subjects Review Committee:

X Project Approved ___ Project Not Approved ___ No Action Required

Patricia M. Keith | 2/9/95 | PMKeith

Name of Committee Chairperson | Date | Signature of Committee Chairperson

OFFICE OF THE PRESIDENT

PROVINCIAL ADMINISTRATION AND INTERNAL SECURITY BOx 30510, NAIROBI

REF. ..OP/13/001/25C 59/2 ..... 27th February 9..95.....

The Secretary,
National Council for Science and Technology,
P.O. Box 30623,
NAIROBI.

RESEARCH AUTHORIZATION

APPLICANT (S) ABEL GITAU MUGENDA

The above named has been authorized to conduct research on

KNOWLEDGE AND ATTITUDE TOWARDS MALE SURGICAL CONTRACEPTION

As indicated on the application form, this research will be conducted in

NAIROBI

For a period ending JUNE, 1995

Under the Standing Research Clearance awarded to Kenyan Universities/Public Institutions.

I herewith enclose copies of his/her application for record purpose. He/She has also been notified that we will need a minimum of two copies of his/her research findings at the expiry of the project.

R. MUSE WANASAKAAMI
FOR: PERMANENT SECRETARY/PROVINCIAL ADMINISTRATION

c.c.

CHAIRMAN
DEPT. OF BUILDING
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APPENDIX C

CORRESPONDENCE

LETTER NO. 1

Dear student,

Your name has been included in a random sample of 450 students to participate in a study. The purpose of the study is to investigate male students' knowledge of, attitude towards, and interest in vasectomy as a family planning method.

I will be contacting you to obtain your consent to participate in the study. If you agree to participate in the study, you will be required to complete a questionnaire in a group setting. Information regarding where and when to complete the questionnaire will be communicated to you later.

I look forward to talking to you.

Sincerely,

Abel G. Mugenda,
Graduate Student
Iowa State University.

LETTER NO. 2

Dear student,

Thank you for considering participating in this study. The purpose of this study is to investigate male students' knowledge of, attitude towards, and interest in vasectomy as a family planning method.

As a participant in this study, you will be required to complete a questionnaire individually but in group setting. The questionnaire will take 30 minutes to complete. The following are the terms of participating in the study:

1. The information you will provide will be confidential. No identifiers will be used on the questionnaires. Thus all responses will be completely anonymous.

2. You have a right to withdraw your consent and to discontinue participation in the study at any time without prejudice to you.

3. The information obtained in this project will be used for a dissertation. All data will be summarized and reported in group terms only.

4. Before participating in the study, the researcher offers to answer any questions regarding the purpose, procedures, or anything else related to the study.

Thank you for your help and cooperation.

Sincerely,

Abel G. Mugenda,
Graduate Student
Iowa State University.

CONSENT FORM

If you agree to participate in the study on "Factors Related to Early Interest in Vasectomy as a Family Planning Method" conducted by Abel Mugenda, please sign below:

Respondent's Signature _____

Date _____